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Hard disk POWER GUIDE

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Wireless hacking
Is your network secure?

Windows 2000 Server
Tame the beast with
set up tips and tricks

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ACTION: For more information about wireless mobile computing solutions, talk to your Toshiba MobilePlus specialist reseller, visit www.unplugme.com.au or call 13 30 70 for your *Wireless for You* information kit.

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Make an
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HARD DISK POWER GUIDE

59

You want more storage space? Here's how to get it! APC reviews 14 hard drives, from budget-beaters and portables drives to performance kings; and we assess ten hard disk utilities for partitioning, imaging and data migration.

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How secure is 802.11? Is your wireless home or business network exposed to the outside world? APC's got the real story behind the scare.

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SUPERCOMPUTERS ►

They model global climate patterns, create armies of digital actors and render stunning special effects on the big screen. We show you some of the most powerful computers on the planet.



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TECHNOTES ►

Hard drives may be bigger and faster but they can, and do, still fail. What happens when your data bites the dust?

WATCHDOG

What happens when your ISP changes your email address? And more on Palm's "replace, not repair" policy.

OPINIONS

Broadband pricing, killing spam, and Microsoft advocacy.



ON TEST 29

APC puts the latest hardware and software through its paces to help you make an informed buying decision.

REVIEWS

Dell Inspiron 4150, Fujitsu LifeBook P2110, Matrox Parhelia-512, MindAvenue AXELedge 1.5, MYOB AccountEdge for Mac OS, Siemens SX45, Sony Cyber-shot DSC-P9, Fuji FinePix S602, Hallmark Viewmaster Svelte, Norton Internet Security 2.0 and Panasonic's SV-SD80.

FACE-OFF

Scan wars: Canon CanoScan D1250U2F vs HP's Scanjet 3570c.

NEW GEAR

The latest kit, including SMS modems, card cameras and more.

TECH BRIEFING

Comparing the ATA-100 and ATA-133 hard drive specs, and exploring the new Serial ATA interface.



SMART 102



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CAREERS: MICROSOFT CERTIFICATION

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TECHLIFE 116

PC GAMES: NEVERWINTER NIGHTS

RPGs have a new killer app. Also, Warcraft III and Grand Prix 4 push the RTS and racing genres to new heights.

CONSOLES

Smash Court Tennis Pro Tournament for PS2; Gun Metal for Xbox; and Lost Kingdoms for GameCube.



DVD: THE LORD OF THE RINGS

The DVD version of this rousing fight against oppression and insurmountable odds begins here. No, it's not another Microsoft antitrust case, rather Tolkien's classic, *The Fellowship Of The Ring*.

WORKSHOP 123

MOTHERBOARD OF THE MONTH

If you're hankering for a little PC2700 action, David Lin finds you can't beat the ASUS A7V333.

ALSO STARRING...

iPod hacking; Gnome 2.0 hits Linux; the Mac OS Unix command line; running your own FTP server; 100 megabit networking in Windows 2000; PHP and MySQL web administration; Photoshop optimisation; making PC DVD multi-region; and Palm memory tweaks.



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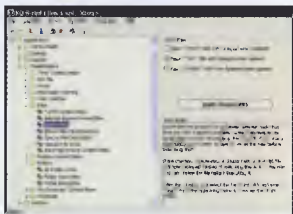
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HIGHLIGHTS

POWER-UP WINDOWS

Watch these utilities extract more out of your Windows OS by powering-up your in-built functions. Some boost performance and others improve file management. Why stick with what you've got when it can be so much better!



AMERICA'S ARMY

Stripped of its healthy load of US patriotic spiel, America's Army is a very cool gaming experience. If you want something that will give you a good indication of whether your PC can handle the next generation of games, the America's Army demo is a good place to start.



CDI INDEX

FEATURES

HARD DISK TOOLS 4Diskclean Gold 3.0, Drive! For NT 1.0, HD Tach 2.61, HDSpeed 1.1.0.25, IBM Drive Fitness Test 3.01, IBM Feature Tool 1.50, IBM SMART Defender 1.01, Maxtor Powermax 3.04, Michael's Disk Benchmark, Seagate SeaTools Desktop 2002

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WIREFUSION 2 FULL WORKING VERSION WireFusion 2 — full working version, WireFusion 3 demo plus a special offer.

WIRELESS HACKING Network Stumbler 0.3.23, Mini Stumbler 0.3.23

WORKSHOP

FTP SERVERS GuildFTPd 0.999.5

IPOD Address Book to iPod 1.0.1, bPod 1.01, Entourage to iPod 1.0.1, EntourageEvents 1.3.1, EntourageMail 1.1, EntourageNotes 1.3, EphPod 2, FileMaker to iPod, iPod It 1.1, iPod text editor 1.1.1, iPod Updater 1.1, iTunes Scripts, Musician's iPod Tools, Palm Desktop to iPod, PodNews 2.02, PodNotes 1.3.1, Podtext 1.0

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PHP AND MY SQL php_man.zip, phpMyAdmin 2.2.6

WINDOWS AnalogX Netstat Live 2.1.1, NetworkActiv Sniffer 1.4.2.1, ZoneLabs' ZoneAlarm

month

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ON TEST

REVIEWS MYOB AccountEdge 2

LABS CHALLENGE Acronis Migrate Easy Deluxe, Acronis TrueImage Deluxe, Diskeeper 7.0.398t (Workstation evaluation), Hard Disk Manager 5.0, Image Sheriff, PerfectDisk 2000

SMART BUSINESS

Microsoft Component Checker, Service Pack Manager 2000 v6.4.3.5, Windows 2000 System Preparation Tool, Version 1.1

NEED TO LOAD

WINDOWS Backup Genie 1.42, Chaos Shredder 2.2, Check Domains 2.5, Customizer XP 1.8.3, eBilling for QuickBooks 2.1, FruityLoops 3.5, NJStar Communicator 2.3, PowerMenu 1.50, SMSDemon 1.1, TW-Renamer 2.4

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TOOLKIT

A4 Paper Sizes 10.2, Ad-aware 5.83, Adobe Acrobat Reader 5.0.5, apmcd 3.02, Bibliographer 1.1.1, DirectX 8.1 runtime, DivX Video Bundle 5.0.2, Fire 0.31.a, Firestarter, gFTP 2.0.9, GIMP 1.3.7, ICQ 2002a Beta Build #3728, IE Restore 6.5, InfoEdit 2.0, iSwipe 1.1b5, Microsoft Windows Media Player 7.1, MT-Newsatcher 3.2, RAR for Linux 3.00, RealOne Free Player, RefUpdate 2.01, TinkerTool 2.2b, Winamp 2.80, WinZip 8.1, WS_FTP LE 5.08, XMMS 1.2.7 for RedHat 6.x, XMMS 1.2.7 for RedHat 7.x, ZoneAlarm 2.6.362

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TECHLIFE

GAMES Airborne Assault, America's Army Recon, Battlefield 1942

REQUESTS

CDex 1.40, FreeZip 1.4.9, Modem Booster 3.0, SBS: Alchemy, SBS: Eatcarpet, SBS: Front Up

BROWSERS

Microsoft Internet Explorer 5.1.5/5.2.1, Microsoft Internet Explorer 6.0, Mozilla 1.0, Netscape 6.2.3, Opera 6.04 Bundled with JRE 1.3a

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ISSUE 285 SEPTEMBER 2002



Sharp-eyed readers will have detected some tweaks to APC in recent months. Some have been subtle, such as the introduction of new typefaces for the body and headings, and others have been more readily noticeable — a sharper layout for our Need To Know news, plus a one-page index for our extensive On Test reviews. And our Motherboard of the Month in Workshop couldn't be more in-your-face!

Speaking of Workshop, you may also have noticed that this very hands-on section of APC has gained an even stronger focus and a broader mix of content.

What's behind it all? It's evolution. It's about the continued improvement of APC magazine. Change is the only real constant in this industry, and improvement is (or should be) the norm for any business.

So our evolution of APC is about change for the better. And that's the reason for this month's reader survey, which you'll find towards the back of the magazine. The survey will also help us learn a little more about you, and chart the course of future issues — from the stories we write and the type of products we review, right down to the way we design the magazine.

And remember that the feedback loop doesn't stop with this survey. Every email, fax or even those old-fashioned letters all make a unique contribution to APC. Some of the best stories we've done were sparked by readers' suggestions or comments.

So take a few minutes to complete this month's reader survey (which also earns you the chance to win a pretty cool prize), and work with us on the continued evolution of Australia's leading computers and technology magazine.

David Flynn

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**Pacific
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need to know

News, views and analysis from the IT world

Safety net or booby trap?

Palladium: Microsoft's bold new world or Digital Rights Management trojan horse? Justin Kranzl investigates.

A palindrome reads the same forwards or backwards. Microsoft's Palladium strategy would seem like a palindrome too — the intent is readily apparent whichever way you put it.

Microsoft says that Palladium's intent is to offer increased user/enterprise privacy, asset and information security, and improved system stability. However, this could also be understood as "external interference with your PC's operation, usage of your bandwidth, and reduced user-level privacy." Clearly, there are two sides to every story.

The nuts and bolts of Palladium as a software security solution are tied very closely to the Trusted Computing Platform Alliance (TCPA), a group consisting of Intel, IBM, the then-separate Compaq and Hewlett Packard, and of course, Microsoft.

A cynic might suggest that the roots of the TCPA lay in the overwhelming rejection of Intel's processor serial number (PSN) scheme, born with the Pentium III and dead shortly thereafter. Intel's validated PC concept may well have struck a chord with some of today's TCPA players.

The TCPA sees future motherboards as having a "Fritz" chip or dongle onboard. The name is a reference to US Senator Fritz Hollings, a politico so diligent in his pursuit of the big players' digital rights protection that some have called him "the Senator for Disney".

This chip will work with Palladium software to authenticate system hardware and software to make sure it's in the TCPA good books. If Fritz doesn't like the cut of your PC's jib, you must validate the offending components online.

Just who is the arbiter of what's legit on your PC is unclear at present, but Microsoft seems to be a logical starting point.

The good news is that a Fritz/Palladium box will jolly well rodger most pirates. Also, current methods of data snooping and virus



attacks will be made extremely difficult, companies asset control will be a breeze, and a trusted hardware/software combination should theoretically increase operational stability.

The bad news? Well, privacy is an outmoded notion anyway. Sure, theoretically your unique combination of hardware/software licenses means your PC's (read: your) movements — both virtually and real world — can be tracked ever more efficiently, but that's probably a good thing.

Of course, those unenlightened souls who aren't aboard the Palladium/Fritz express (presumably using dated hardware and OSes) will miss out on all this fun. And you AMD fans smirking in the corner need not get smug; Intel's main competitor is also with the program.

Now it's about this point that Digital Rights Management (DRM) gets mentioned. Well, there's apparently no need. A Microsoft white paper business overview of Palladium specifically mentioned that Palladium "will not require digital rights management technology, and DRM will not require Palladium."

Microsoft obviously has taken the view that while Palladium is an ideal platform to enforce DRM technologies, the initial outcry would be counterproductive. The white paper even says that Palladium-equipped systems will ship with

the system disabled by default, and even active systems can be disabled at a hardware level.

Well, that's the plan for now anyway. **EFF**

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The Bone Collector

William Maher visits "The Bone Collector," a hard disk doctor with no shortage of work.

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Dispatch

Why the tragedy of September 11, 2001 was turned by some into an IT PR dream.

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Watchdog

Your email address is like an extension of your name. But when an ISP takes it away ...

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epinions

One reader defends Microsoft bashing, another puts forward an anti-spam plan.

Switchers make MS twitchy

Apple is out to turn the tables on Microsoft and reinvent the Mac as the champion of open standards.

What do you call someone who has ditched their PC for a Mac? Apple calls them "switchers" and together they want to convert you.

The ultimate Mac/PC showdown has been simmering ever since Steve Jobs returned to Apple five years ago. Since then, he's dragged Mac into the mainstream by redesigning the hardware and rewriting the OS.

So why does the Mac only occupy 5% of the personal computer market? To grow, Apple has to win over PC users. Jobs opened his July Macworld keynote by declaring a lot of Windows users want to "switch" to Mac. He said the first month of the company's advertising blitz, featuring stories of real people who had switched to Mac, has been a huge success.

To persuade the masses the Mac is no longer a limited proprietary platform, Apple is backing a series of open cornerstone technologies that Jobs believes the rest of the industry is heading toward. "Except for Microsoft," he added.

Anti-MS sentiment is a strong element of the Switchers campaign. Billboards across the US scream slogans such as: "I fight with my PC all day then come home to a Mac that works," Aaron Adams, Windows LAN Administrator.

Apple's message that MS toes the proprietary line strikes a chord with Mac and PC users alike. Systems administrator Google Endieveri runs a 50% Mac/PC environment for a US multimedia company. "Microsoft are not pushing open standards. They don't seem to want it," he said after hearing Jobs' keynote. Endieveri however still needs PCs for complex CGI operations. "I've got a little problem with Microsoft getting more and more like Big Brother."



► At Apple's New York store in Soho, shoppers can pull up a bar stool at the Genius Bar and pour out their Mac troubles. "We get everyone, from first Mac to PC switchers," said Kyle, a qualified Mac "Genius".

No wonder Microsoft ambushed the launch of Mac OS 10.2 at Macworld. Implying Apple's new Unix-based OS hasn't been the success Apple says it is, marketing director of Microsoft's Macintosh Business Unit, Tim McDonough, said that of the 300,000 copies of the latest version of Office sold, the majority were for legacy Mac OS 9 systems. The features Jobs showcased in OS 10.2 are well ahead of XP (including central address book, Bluetooth support, high-level Net searches, hand-writing recognition and built-in spam filtering).

The swipe revealed that although the Mac remains a minnow compared to Windows, Apple can still make Microsoft look bad. McDonough also said the "relationship" between Apple and MS engineers remains strong. "The relationship and the business are different things." Adding that Microsoft will only continue to develop for the Mac "as long as there's a good business. Right now we're making the bet that there will be. I can't predict the future beyond that."

Apple meanwhile is pushing compatibility with other platforms and based on open standards. The new look "open" Apple is courting new and existing Unix developers. Apple claims the Mac is the number one supplier of Unix software (with over 3,500 applications for OS X and "bigger than Sun," Jobs said).

The software may be more open, but the hardware choices remain set in stone. What would entice you to switch?

Fiona Angus

Hot-nailed

The days of free email services is drawing closer to an end with the recent announcement that Hotmail is deleting messages in the Sent folder that are more than 30 days old.

The move is part of a push to encourage users onto paid services. Microsoft hopes customers will pay US\$19.95 (\$37) to get 8MB of Hotmail space on top of the 2MB currently free, plus the company has cut access to POP accounts.

Yahoo meanwhile is pushing a similar barrow, and Apple has announced it will no longer offer free email. Hotmail users can save Sent folder items by moving them to a newly created folder.

Plastic TV

From wider to flatter to floppy. Coming soon to a futurama near you is roll-up, flexible television. Lab boffins at Britain's Cambridge Display Technology (CDT) facility have perfected a glowing plastic compound which is printed onto thin plastic like paper to produce a television. Analysts say the global market for light-emitting screens grew from \$20 million to \$25 million in 2000, and is expected to be a \$3 billion market by 2005.

Philips recently demonstrated an all-plastic display device that was one 50-millionth of an inch thick. Sony, Hitachi and Toshiba have joined the roll-up race, and the US military is similarly developing roll-up battlefield maps fed by overhead satellites.



Open wide

The one-time champion of the proprietary operating system and the obscure AppleTalk networking protocol, the latest release of OS 10.2 (aka Jaguar) is packed with emerging open technologies Apple want the rest of the industry to support, including:

- **Rendezvous** — Automatic IP discovery
- **Bluetooth** — short-range wireless
- **iSync** — SyncML standard for synchronising multiple devices
- **MPEG 4** — QuickTime multimedia codec

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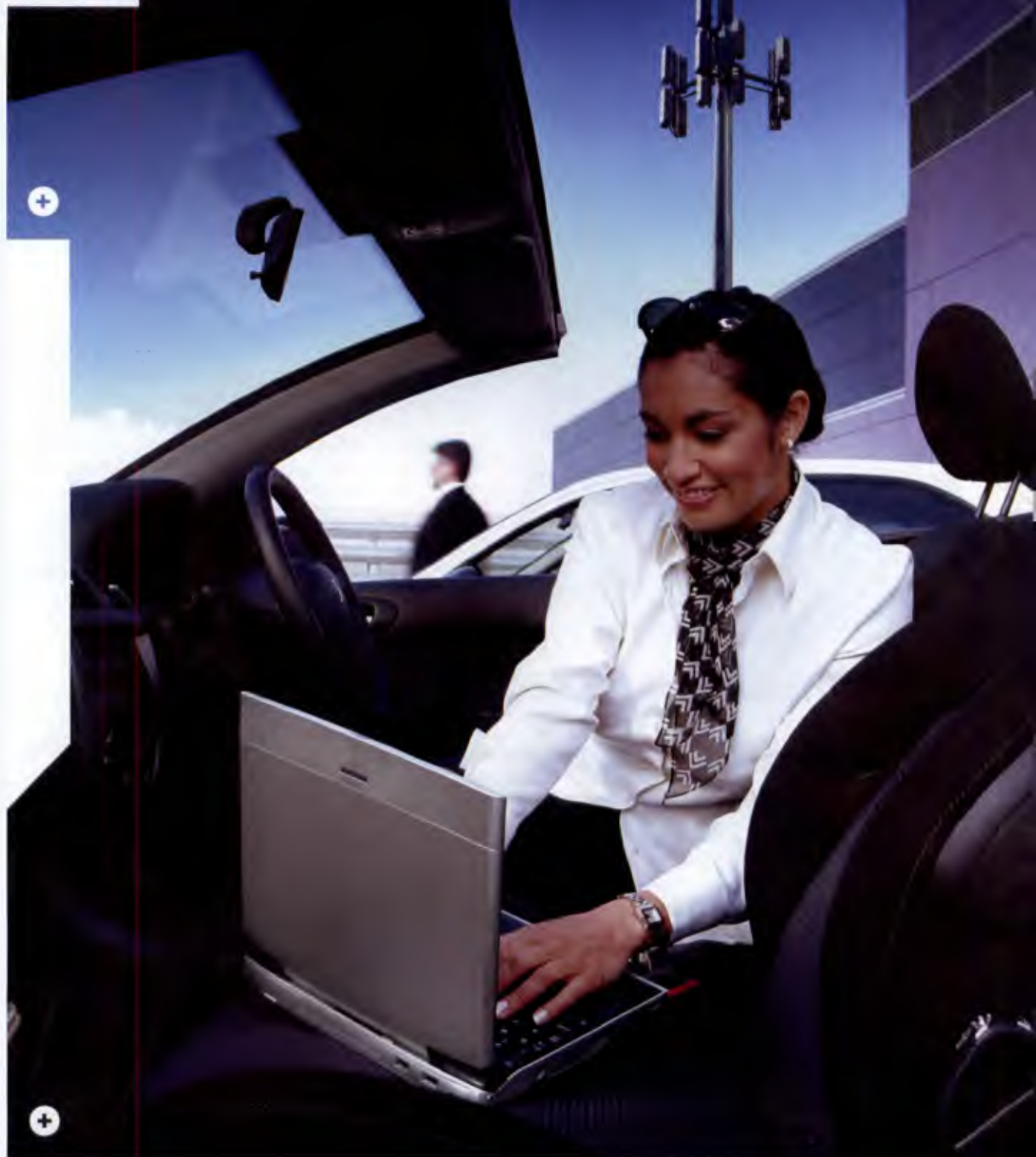
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Spoof strategy

"Spoofing" fake songs onto P2P

networks is one anti-piracy scheme.

Until recently, piracy and copyright infringement was largely a hand-wringing exercise. Apart from Sony and industry groups such as the Recording Institute Association of America (RIAA), clamping down on popular peer-to-peer (P2P) setups has seen little concrete action taken against it.

Late in July, Sony had a small win when the Federal Court ruled that Mr Eddy Stevens had infringed upon its trademarks by offering pirated copies of PlayStation games for sale. Unfortunately for Sony — and much to the delight of the Australian Consumer and Competition Commission (ACCC), which sent out a gloating press release, Justice Sackville stopped short of saying that "mod chips", which allow all region or pirated games to be played on a "chipped" console, infringed copyright.

Then there is the issue of how piracy is regarded internationally. While efforts are being made to raise the profile of such activity in Australia — the Business Software Association of Australia (www.bsaa.com.au) claim to be turning the tide — other areas don't view it as a legislative or law enforcement priority.

The International Planning and Research Corporation's most recent Piracy Study revealed interesting trends in retail software piracy. Australia's relatively small 27% piracy rate statistic is dwarfed by the likes of Russia (78%), China (92%), and Vietnam (94%, down from 99% in 1996).

For every country reducing the amount of

pirated material, another country appears to have a corresponding increase.

So with no major initiatives pushing either way, what are the big guys doing? One novel initiative taken to stem the flood of P2P traffic in pirate music has been for companies to "spoof" fake songs onto P2P networks. Unsuspecting copyright infringers download the song, only to find a repeated sample loop or long gaps of silence within the song.

The RIAA has no qualms about the morality of using bandwidth in this approach. According to RIAA President Cary Sherman, "[Spoofing is] an appropriate response to the problem of peer-to-peer piracy... I think it would be crazy if record labels, motion picture studios or any other owners of content didn't take advantage of those kinds of measures." Measures which Sherman presumably is aware detract from legitimate use of such networks and contribute to congestion.

Then there's the guys looking to make a buck. MediaDefender (www.mediadefender.com) are essentially spoofers for hire, operating off venture capital and keeping P2P networks in their sights by using similar tactics — dummy entries to discourage copyright infringement.

Critics say that this type of approach doesn't solve anything and is a retrograde step. After all, there is no positive outcome gained. And Joe Blackbeard is just as likely to keep pursuing MP3s via P2P until he finds non-spoofed versions, so it's a delaying tactic at best.

Factor in the more serious distribution of entire music and software "packages" via IRC and private FTP sites, and it seems that such actions fail to address the serious end of the market.

Justin Kranz!



► "Okay, so that's two steakburgers, a small fries and an illegally burnt VCD of Windtalkers."

Trust the Net

The "People's Minister", Senator Richard Alston, has recognised that SMEs also use the Internet, but don't always have a large IT staff at their disposal. With the "People's Money", he's ordained the overdue Small Business Guide to Esecurity. A



Richie A wants yall to be cool wit da Net.

comprehensive suite of resources covering Web site security, secure transactions, virus protection, minimising real world risks, digital certificates, and authentication systems are all explained at www.noie.gov.au/trustingtheinternet.

ROgg on!

Developers, musicians and audiophiles can dance to a new beat with the release of the open source music format Ogg Vorbis 1.0 (www.xiph.org). The royalty-free codec provides an alternative for anyone publishing music either for personal or business use, such as a soundtrack to a game or corporate video. Its creators say the compression used for Ogg Vorbis is on par with MPEG-4, meaning its sound quality is better than MP3 across a range of compression rates.

Stat stoush

Telstra claims it's set to reach one million broadband subscribers by 2005 after topping the 175,000 mark in July. For a few hours, its boast that customer requests had doubled over the last six months looked pretty good. Then Optus released figures showing its broadband subscriber base had grown by 100% in 12 months. "It's official, we now have more than 65,000 OptusNet Cable customers," a spokesperson crowed. "Although total broadband penetration in Australia is at approximately 3%, the Optus experience is different." Broadband penetration in areas covered by its network is more than two and a half times the national average. Pity it covers such a small area.

Feast to a famine for IT's has-been workers

From dot com to dole queue, years of plugging the fabled IT skills shortage has left thousands of IT professionals out of work.

Once upon a time a job in IT was a ticket into Australia and the cruising life. Glorious perks and outrageous salaries were fed by what the Australian Computer Society (ACS) called the "spiralling IT skills shortage."

Australia imported IT workers en-masse to address the "crisis." Now, in the current IT employment downturn, the people who came to Australia in pursuit of opportunities to showcase their skills are finding it even harder to compete for scarce jobs.

The Government is desperately winding back immigration breaks to stem the tide of IT imports. It recently revoked the visa fast-tracking for IT workers and halved the number of IT specialisations on the priority immigration hot-list.

The ACS was also granted the power to assess visa applicants. "There's been a limited number of jobs to fill for 12-14 months and any addition to the pool makes it harder for everybody," said ACS president Richard Hogg.

They immediately raised the standard by introducing a minimum level of professional experience. But it's not enough. The ACS also wants the Government to stem the tide of IT workers slipping in through the short-term, company sponsored visa program.

"They are not assessed for skills or qualifications at all. It's totally uncontrolled. That's the stream that should be more tightly monitored," Hogg said. "By slowing the immigration stream, hopefully the opportunities for local people to get work will improve."

The Government will reconsider visa fast-tracking for IT professionals when biannual employment figures are released (early indications are that it won't be reintroduced anytime soon). "We've got to be careful that it's not shut off entirely because if and when business picks up again, we expect the IT industry will pick up as well," Hogg said.

Was the IT skills shortage a figment of the dot com hype? "No. Not at all," replied Hogg. But that's cold comfort for the unemployed local and imported talent asking why the Government made their life that much harder.

Fiona Angus

Postmortem

The boom — Companies throw cash at Internet, Y2K and new technology projects ranging from ERP to ecommerce implementations. IT vocations are no longer undesirable as the mainstream envies the money of people in technology. The ACS Salary surveys show IT salaries increased over 5% during 1999, 2000 and 2001. And that's only because workers have quit their salaried jobs and work as contractors, charging more for a day than most people earn in a month. Retired programmers get off the couch for one last hurrah of code fixing. Their new pay makes their superannuation look pitiful.

The balloon — Industry estimates 30,000 IT jobs can't be filled. The future of Australia's global competitiveness is at stake. Ditto our ability to squash Y2K bugs before impending disaster such as banks nicking all our money, planes falling out of the sky, utilities and telecommunications falling to pieces. Oh, and

the conversion of ERP systems to handle Euro dollars also gets a guernsey. The Department of Immigration introduces priority visa processing for IT workers, granting permanent residency to an estimated 5,000 extra IT professionals each year. Another 10,000 short-term visas are granted to IT workers sponsored by individual companies each year.

The bust — The stock market crashes in April 2000, and thousands are laid off as companies shut down Internet projects and attempt to absorb years of IT over-spending. Anyone associated with IT is branded a heretic responsible for hyping a false economy that costs ordinary families in affluent Western countries their fortune due to dud stocks.

The breakdown — Up to 90,000 Australian IT workers are currently unemployed, estimates one multinational IT company. The ACS Salary Survey shows salary growth slowing to 4% (the first time the growth rate for IT salaries was lower than the annual increase in Average Weekly Earnings).

Going once, going Spike ...

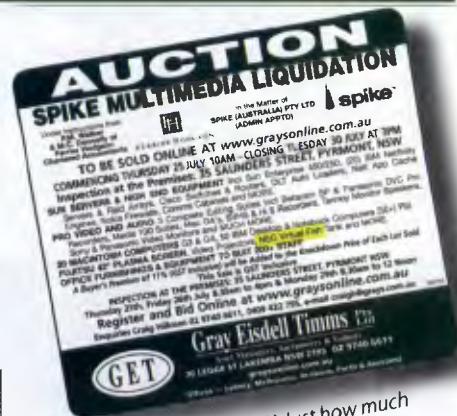
The liquidation auction ad for Spike multimedia must have had one-time Spikers cringing in their lattes.

In true infomercial-style "and MORE" was thrown around with gay abandon. Sadly, those uppercase letters were about the only capital Spike had left by the time it had finished, further underlining the dot com sector's malaise.

While the Australian market seems to be easing past the troubles occurring elsewhere in the world in the wake of WorldCom's accounting disaster, some existing operators appear to have run out of momentum within sight of the long-projected upturn.

Witness OpenTel. The beleaguered telco engineering firm, valued one time at \$2 billion, is in voluntary receivership after cash flow troubles put it out of operation.

The consequences for the sector go beyond mere financial concerns. The brain drain that



► (Source: AFR 23/07/02) Just how much would you pay for a virtual fish tank?

occurred as professionals went to safer occupational pastures meant that the cachet associated with careers in the Internet industry was no longer.

It's not all bad news though. Overseas, Amazon.com's continuing rise in sales meant that its recent Q2 loss of "only" \$173 million was regarded as a positive sign.

Pundits will be hoping it's not the highlights of another WorldCom-style freight train.

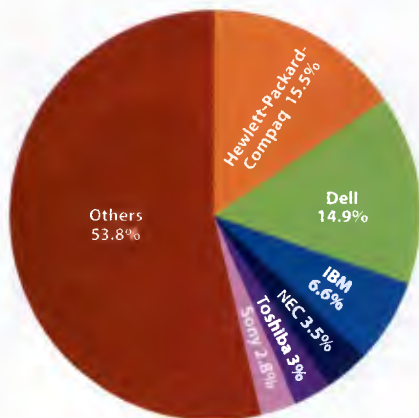
Justin Kranz

“We are confident of meeting our target of **One million [broadband] customers in 2005”**

Dr Ziggy Switkowski, Telstra's Chief Executive Officer. July 2002.



In 1999 Ziggy was equally confident that 750,000 homes would have broadband by 2002. Reality: Today Telstra has 175,000 retail *and* wholesale customers.



Worldwide PC Vendor Market Share (Dataquest)

31.1 million

(IDC — Worldwide PC sales for Q2, down 0.5% from 2001 Q2)

29.9 million

(Dataquest - Worldwide PC sales for Q2, down 0.6% from 2001 Q2)

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The bone collector

Hard drive failures can be a PC owner's worst nightmare — and the problem doesn't seem to be going away. *William Maher reports from one very busy "bone collector's" yard in Melbourne.*



Brian Nestor has seen a lot of hard drives in his time — in fact he's got a collection of thousands, all crammed into a former bank vault in Melbourne. Old drives, new drives, small drives, big drives, broken drives, drives from the UK, USA, Germany and even Finland. Drives stuffed into bins, in drawers and up ladders on eight foot-high industrial shelves, every one carefully numbered and catalogued.

Nestor says he may have the largest single collection in Australia. He's even tucked away a spot for twenty-year-old museum pieces — he calls that area the "boneyard".

Business is booming for places like this — a hard drive repair centre where Nestor painstakingly retrieves data and fixes a steady stream of busted drives using his library of spare parts.

It's a place of last resort for the games players, businesses, families and government departments that have lost precious data from hard drive crashes each year.

SPIKE IN HARD DRIVE PROBLEMS

The number of drives arriving for some TLC inside Nestor's fix-it shop is increasing — growth rates have jumped from an annual 48% to 120% this year.

"The number seems to have lifted a lot. [It could be] configuration setup problems, a larger quality of drive failures, or just more drives out there in the market place," Nestor theorises.

While companies like IBM and Seagate race to develop greater storage capacity and more sophisticated hard drive technology, gremlins are as active as ever, threatening to turn shiny new drives across desktops everywhere into expensive paperweights.

As drives crash, letters, documents, unfinished novels, school projects, business accounts are all at risk of disappearing forever.

Official failure rates are very low (about five in every 1,000 drives, says storage solutions company Maxtor), but anecdotal evidence suggests retailers are seeing more and more broken drives. These are drives that have been burnt out, dropped, are lemons or "clunkers" (the slapping noise as the disk head rattles round failing to find the disc platter properly).

"The failure rate has gone through the roof," says Steve Ward, manager of Ward Enterprises, a PC and electrical shop on the NSW mid-coast. "It's probably in the last 12 months we've really noticed it, and in the last three months it's really accelerated dramatically."

At Ward's relatively small shop, the number of drives brought back by customers has increased from about three or four a month to about 10. Other shops are noticing a similar trend. In Newcastle late last year, a Leading Edge shop found that 80% of one single shipment of drives was faulty.

Earlier this year the same Leading Edge store had another 15 to 20 drives fail, this time from a different manufacturer.

WHO'S TO BLAME?

"We've hunted around trying to find whether one brand is better than the other, but it seems to us to be across the board," says Ward.

Coming in for varying degrees of criticism have been IBM, Fujitsu, Maxtor, Seagate and Western Digital.

For some unlucky PC owners the problem is turning the tech-lifestyle into a tech-headache. When drives fail it can be a major crisis. This is compounded because in most cases people don't realise warranties cover only hardware, not their data.

"It causes an immense amount of pain, because usually they've lost everything. One lady said to me it's almost like a burglary; the kids' first poems, their homework, their Year 10 assignments, the little letters they'd typed for Dad for his birthday," Ward recalls.

As more PC owners buy second or even third hard disks, Ward and others are spending more time burning the midnight oil, recovering lost files and reinstalling drives. And it's taking a lot longer.

"The drive is like a five minute job. It's four screws and two cables. But then you've got to load Windows. You're talking two hours. The average household computer I would say takes two to three hours," Ward says.

In serious cases, some retailers are paying staff overtime to work special late shifts focused on drive-duty.

Small stockpiles of drives are also growing

like emergency supply shelters; the technology crowd can get increasingly agitated at the thought of having no PC for a few days.

Ward says he has spent thousands on replacement hard disks, which he loans out while customers often wait three or four weeks for replacements from the manufacturer.

COLLECTING THE LEMONS

Back at his Melbourne boneyard, Brian Nestor focuses on collecting lemons — the faulty drives that make their way onto the market. As soon as he hears about one he stocks up on that model so he'll have plenty of spare parts. He can rattle off a list of drives he's seen problems with, sounding like a motor mechanic talking engines.

There were the Quantum drives that blew circuits; the Fujitsu with bad actuators; the Seagate "clunker".



... a "couple" of vendors in the last 6-9 months have had an increase in drive failures worldwide, says one analyst

"No brand of drive that I can recall in the last 20 years has been kept out of this. Everybody has had their fair share."

Last year consumers in the US took the unusual step of filing a class action lawsuit against IBM, alleging reliability problems with its Deskstar 75GXP drive.

When IBM introduced the drives, they contained some cutting edge technology that helped make them among the largest ever for desktop PCs — but hundreds of users complained of disks crashing and making loud clicking or scratching noises.

"It's very difficult for them [storage companies] to know where the drives are and

withdraw them. It's a high cost exercise. It's almost better to cross their fingers and hope they don't get too many problems and it'll go away," explains IDC storage market analyst Graham Penn.

Penn confirms he knows of "a couple" of vendors in the last 6-9 months that have had an increase in drive failures worldwide. However he won't reveal names. "Just because you get one problem with one brand, doesn't mean it's the same problem across all product lines," he says.

That hasn't stopped retailers and PC owners now questioning the reliability of drives. Newer drives, for example, have faster spinning discs that generate more heat, and have smaller gaps between the read/write heads and the disc. "That is becoming an interesting issue. The closer they get [the read/write heads] the greater the chance of failure," Penn says.

Manufacturers have their own theory. Maxtor's local marketing boss Craig Davis says it's the handling and shipping problems, not the technology, that's the reason for failures. He says PC owners should watch out for "grey market" drives that are imported without official authorisation and may not be subject to strict rules regarding care and handling.

Some retailers will also argue that heat is the problem and the duly warn customers to have adequate cooling fans installed.

Either way, it's a growing problem, and it's going to need fixing. Which is exactly what Brian Nestor's Melbourne "boneyard" is working overtime doing. **ETC**

Tips for an easier life

It's unlikely that your shiny new 80GB drive will break down any time soon. Still, if you're really touchy about your MP3 collection, there are a few things you should be aware of that might just save you a few grey hairs one day. Harris Technology's fix-it man Gaby Mayo has helped us compile these tips for avoiding hard drive headaches.

BACKUP YOUR DATA

A no-brainer really, but you'd be surprised how many people don't bother. "A lot of people don't plan properly, even businesses," says Mayo.

CHECK COOLING FANS

"Good airflow is paramount in keeping system components alive," he says. Dropping a high speed hard drive into a small Pentium II "heat box" will mean the electrics will get warm and might warp when writing data.

GET SAVVY WHEN BUYING

Only buying from reputed dealers helps avoid "grey market" drives that might have been roughly handled.

EDUCATE YOURSELF

"A browse on Google when installing a drive will save so much hassle," says Mayo. If you are really worried about losing important data, or if your hard drive has been acting suspiciously, install monitoring software.

Hard market

Hard drive development is continuing at a rate of knots, though it's in a tough market wracked by flattening sales forecasts and earning losses and industry consolidation.

Having lost around \$950 million on its hard drive business in the past five quarters, IBM is selling off the unit to Hitachi and focusing on research and development.

In 2001, Quantum sold its hard drive business to Maxtor. Fujitsu also jumped ship from the desktop IDE game last year, leaving behind major complaints about alleged hardware faults.

Manufacturers have responded to concerns

with a range of reliability features that would sound at home on the average family sedan. Maxtor, for example, sells its drives with the promise of new "shock block" protection technology, which controls how the arm sits above the disc. Seagate has a special black rubber wrap it stretches around drives, while IBM has its own vibration-dampening technology.

Drive companies are also trying to speed up the returns process by accepting warranty returns directly. Under its "no quibble" policy, the company will replace the drive, no questions, within 48 hours.

In Melbourne, Brian Nestor is now also stocking more new drives for direct replacements, instead of customers returning

faulty hardware to their retailer. He estimates his library contains about 10,000 drives and growing. "It'll never go away. The level of complexity is such that it cannot possibly get easier. If you want to go out and get the latest and the best drive there is going to be a percentage that will fail," he says.

As PC owners commit more and more personal data to these little boxes the stakes will only go up — IDC predicts that worldwide hard drive shipments will reach 259 million this year, and every year the capacities become larger. In the future, perhaps the hard drive will become as important as an Intel chip to the average PC owner intent on protecting his/her precious data. After all, who wants a trip down to the boneyard?



September 11: PR godsend

For some in IT, the awful tragedy of 12 months ago was too good a marketing opportunity to pass up.

A year after fanatical Muslim fundamentalists steered two jets into Manhattan's twin towers, IT companies are still using this act of terror as a sales tool.

What began as a demand to be patted on the back for providing the products that helped businesses get back on their feet, quickly degenerated in an embarrassing 12 months that showed the IT industry's disgraceful greed manifest itself repeatedly.

Having achieved complete dispassion for the fact that innocent people were crushed in 600,000 tonnes of rubble, and countless more dead from a bloody war that continues today, the IT industry has marched forward with reference to how the event relates to their products. And it shows no sign of abating.

In an interview with Dispatch, Tower Technologies' Noel Jones referred to himself as a megalomaniac three times. It's a contrived use of self-deprecation because he's upfront about not really caring what his critics say. He has a fresh message amidst a year-long onslaught of post-September 11 exploitation: if you ignore the available disaster recovery technologies, you'll rightfully be sued by company shareholders.

"It's one of my pet theories," he said. "If I was the shareholder of a large public company and [a disaster like September 11] happened and they said 'Well, we've got back up with the database, but shit, it's gonna take us three months to work out where we are' — share prices are gonna fall,

so, they had become low ranking celebrities. Ten days after the towers tumbled, StorageTek CEO Patrick Martin was on CNBC television talking up his company's role in helping rubbled companies get back to work. As warm bodies laid trapped, Martin concluded the interview with: "I'm certainly optimistic about the company's prospects and about the future of the industry."

Then it was the security industry's turn. After news broke that al-Qaeda operatives used email to coordinate themselves, suddenly cyberterrorism was rife. If it wasn't quite rife, then it could be, if we weren't protected from "aggressive code" with terrorist-proof security software. Forget hijacked planes, your network was at stake. Utilities and telecommunications could be compromised, like with Y2K, except it never happened then so it'll be *really* bad this time.

And then came the backlash. The world clued into the fact that scaremongering was being used to filch millions from desperate customers. Storage giant EMC decried the tactics of its competitors. "I was appalled to see some of our competitors using September 11 as a marketing tool," EMC chairman John Tucci told ZDNet.

Tucci said his company suffered dearly for not exploiting September 11 to scare customers into buying his solutions. He whinged about it as he posted a \$70 million loss, and in doing so marked a new era of September 11 exploitation. It was now a catch-all excuse for poor financial performance across every industry. Of course, the economic slowdown showed signs of

Scaremongering was being used to filch millions . . .

the company may be mortally wounded. Have the directors performed to corporate governance correctly? I don't know, it's interesting."

It sure is, especially when you're the head of a \$100 million document management company, which has the solution you need to avoid this pending litigation. Of course when pressed Jones knows his polemic is little more than publicity schtick. His own lawyer mates told him that any case would be laughed off because directors can only ever exercise "reasonable care."

But that's not stopping Jones from bleating his mantra in *The Sydney Morning Herald* and *The Age*, at trade shows, and this month he takes it on a series of customer roadshows.

Jones is just the latest spruiker in what has been a year of schlock. Within days of September 11, disaster recovery and storage companies went into a publicity overdrive. They were finally vindicated for pushing products that would make the eyes of the most enthusiastic IT junior glaze over. And in doing

coming before September 11, and we now know that dodgy accounting practices play the lead role in today's downturn.

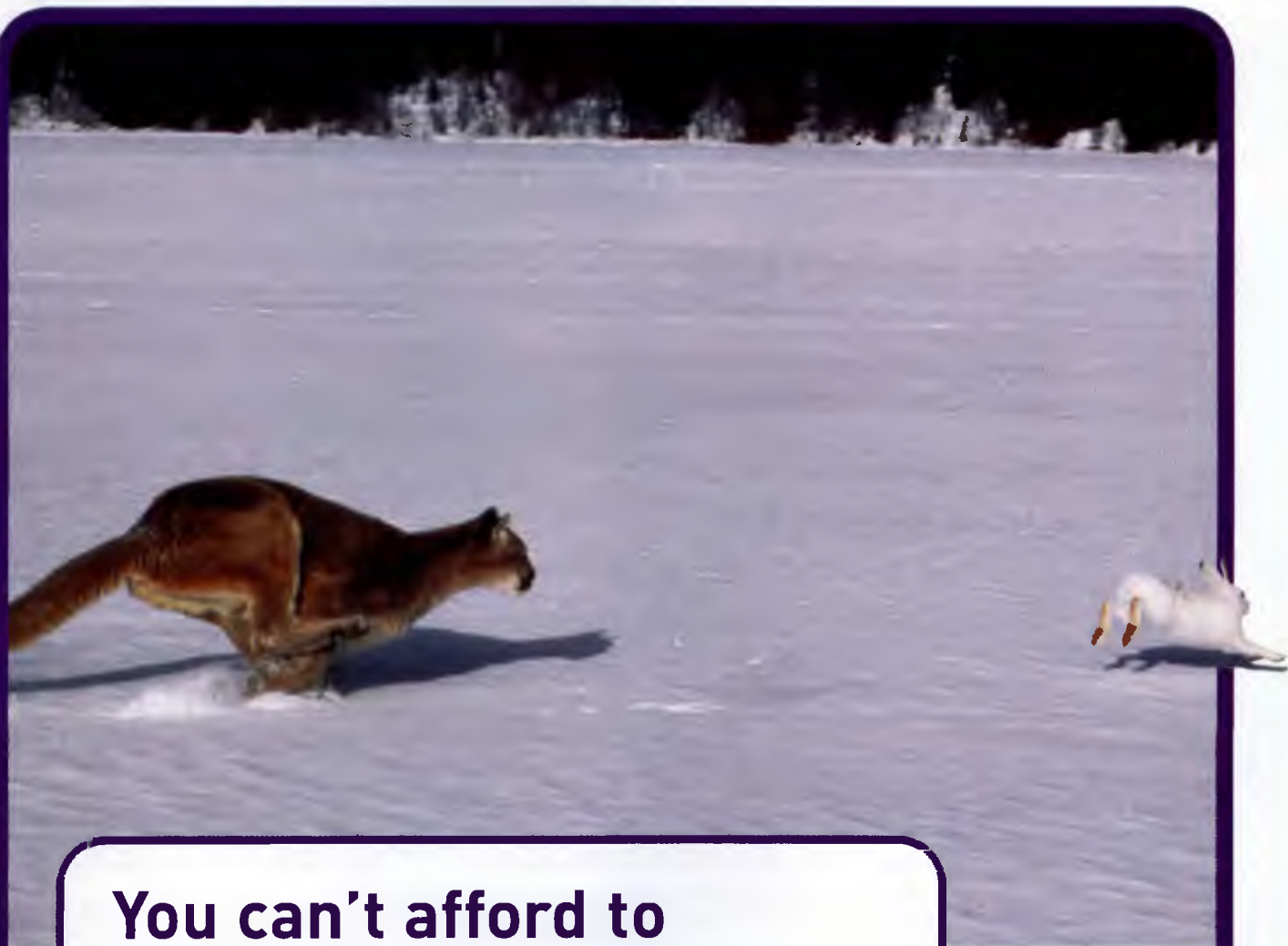
Dispatch won't be made to say that these people are insensitive and repugnant jackasses, fit for a range of medieval punishments, for lacking the moral fibre to acknowledge that tragedies in which human life is lost on a massive scale is not up for grabs to be "leveraged" for commercial advantage.

We won't be saying that because the fact is these misguided souls aren't all bad. Noel Jones was certainly affable and spoke with passion about his company and its people.

But Dispatch wonders if the exuberance to do the best by a company and its shareholders blinded good people to use any event as a marketing tool to hook into their key message.

While Jones and his peers mean well, Dispatch is not sure the families of victims either on that fateful day a year ago, or at war in Afghanistan, would be proud of companies selling products off the back of their spilled blood.

gmontgomery@apcmag.com



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Just say the word

Need to Know Watchdog

Control, conflict and chaos

An email address is like an extension of your name.
So what happens when your ISP suddenly takes it
away?

Dear Watchdog,

We used to be a happy Optus cable household. My family (including my wife, son and two daughters) chose our individual email usernames within the @optushome.com.au domain. Now Optus tell us we can no longer use our email addresses. They've decided to combine all their email servers and make everyone use @optusnet.com.au. This appears to have created havoc across their system. I seem to be getting email addressed to people on Optus' other email servers. It started with a trickle of strange newsletters, then an increase in random spam attacks directed at each Optus domain. Now I have received an email from a prominent bank containing the account and home loan details of a woman with a similar name. I'm extremely concerned that other people could be receiving my private email. Someone has to be held accountable.

Warren Greenwood
Glen Waverley, Vic

Warren initially set up an email filter. "I can reduce the regulars, but the really insidious ones, the porn, always change and mask their address." The volume of mystery emails grew over a two month period.

He informed Optus about the chaos he was experiencing on their network. "All they would do is send me information on how to change the filtering settings in Outlook."

When more confidential emails landed in Warren's inbox, Optus told him he could always change his username to something more obscure. The family weren't impressed. They've been big supporters of OptusNet Cable since it

launched as the Optus@Home joint venture in 1999. "It's been terrific, and very reliable," Warren said. Each family member has a sought-after username. "We were one of the first homes to sign up, and at the time, they said we could pick any name we liked."

Last year, the @Home part of the joint venture went bust and Optus was left to merge all its remaining Internet services under the single OptusNet brand. They began to redirect all their email servers (including @optushome.com.au and @mpx.com.au) to @optusnet.com.au. They told everyone to start using @optusnet.com.au.

That's when Warren started to get flooded with email addressed to other Optus email servers. "Their approach is to say 'that's your problem. Too bad.'" Could other people be reading his email, he wondered? "I'm an auditor by trade and this crossed the line."

Watchdog asked Optus to explain what on earth was going on.

Dear Watchdog,

No emails have been redirected to the wrong email addresses as a result of the email integration. These types of emails will have been incorrectly addressed in the first place, just like dialing a wrong number. No customer will need to change any confidential information as a result of the mail integration.

The main problem here is "Internet Spam" and it affects all ISPs. Spammers send mail to every email address they can think of. Some of these email addresses are real and some of them are not. After integration, some of the new email address that previously would

only have received these mails directed to optushome.com.au addresses would also receive e-mails sent to their username at the other OptusNet domains.

The OptusNet Internet Team

Warren believes their explanation is only partially right. He said people appear to be placing his username in front of other Optus email addresses, thinking it will reach a person in

Dell trapped by fine print

The Federal Court has ruled that Dell misled consumers when the company didn't make it clear you had to pay substantial delivery charges on top of its advertised prices.

The Australian Competition and Consumer Commission (ACCC) hauled Dell into court following complaints about a series of ads Dell took out in APC and major newspapers between 1994 and 2001.

After its courtroom victory, ACCC Chairman Professor Allan Fels said: "Price is a powerful drawcard. It lures the reader in. Prices must be accurate and unambiguous or else you run the risk of breaching the Trade Practices Act. Important pricing information should be precise and not confined to the fine print."

Dell now has to publish ads clarifying the fine print from these previous advertisements.



the other domain. He points out that the wider Net community are simply oblivious to Optus' internal network changes. The old address will be completely blocked if Optus stop redirecting email. Optus promised Watchdog they'll give customers "reasonable notice" if they remove a domain from service. They currently only formally support @optusnet.com.au.

On Guard

Send in the goons

A domain dealer has a novel sales tactic: terrify the customer. Around 100 people received letters from a debt collection agency after they applied for a .name from MelbourneIT.

The new domain is the third in a group of seven new top-level domains to be introduced to the Web since 1988. A special reservation process was developed to streamline the registration process.

However, it turned into an ordeal for Andrew Stroker. He pre-registered his .name with MelbourneIT in February. MelbourneIT immediately charged a \$13 fee to his credit card on the understanding they would deduct the full amount when the new domain officially went live. This was scheduled to happen within a few months.

Then in June, a large debt collection agency suddenly demanded he pay MelbourneIT \$69.30. Andrew was stunned. He hadn't received his new .name or even another bill. Terrified that this could jeopardise his relationship with his bank, he paid up immediately.

He sent MelbourneIT an email asking them to explain their "incredibly unprofessional" customer service. When he didn't get a reply, he rang the next day. The helpdesk told him a "glitch" in their system had sent out the wrong notice.

What kind of system glitch sets a third-party debt collector on the tail of small customers? "All for a matter of \$69.30!" Andrew said. When Watchdog called MelbourneIT, they referred us to a sub-contracted public relations firm.

The spokesperson, Tom Valenta, was eager

For Warren, it's a case of either too much email, or not enough. He's angry Optus won't take responsibility for the confusion or the spam overload.

"I suppose we just put up with it," he said. "I discussed it with the family and we decided that we shouldn't have to change our usernames. We all want to keep our own names."

to help. He reported back to the company and asked them what went wrong.

The explanation? "As a result of the time delay between the actual pre-registration submission and the registration, we had a small number of credit card numbers which we were unable to validate or process.

"Rather than follow these up ourselves, we used our usual collection agency to send a polite letter to these credit card holders asking them to check credit card numbers and that their cards had not passed their expiry dates. Against our instructions, the agency sent letters of demand. When we discovered what they had done, we immediately sent an apology by email to those concerned. There is no credit rating implication for Andrew or the others."

Tom then asked Watchdog not to name the debt collector. "We have had stern words with the agency and are in the process of reconsidering their future with us," he said. At the time of writing, MelbourneIT hadn't fired the agency.

The stuff-up affected less than 100 people, "a small percentage of the overall numbers," Tom said. He assured Watchdog it had nothing to do with the domain registration process. He said they couldn't process the credit card numbers for various administrative reasons.

MelbourneIT quickly offered Andrew and everyone else who had received the letters a free .name registration. Andrew was happy with the .name, but described their follow-up email with an apology "a bit of a joke". He can't understand why they would even consider liaising with customers through a debt collection agency in the first place.

Update

Palmed off pt2

Palm's unusual "no repair" policy has taken another twist. Last month (APC August, page 22), Palm refused to fix the recharge connection on Carl Williams' out-of-warranty IIIe. Rather than repairing, Palm re-sell secondhand Palms from a stockpile of previously repaired units. Under this "no repair" policy, Carl had to pay \$200 for a used IIIe and hand over his broken unit (which would be shipped overseas, repaired and stockpiled). After reporting his experience to Watchdog, Palm replaced Carl's unit for free.

Yet Carl wasn't the only one unhappy with the company's decision not to fix individual units. At the same time, Dennis Christian from Avonsleigh, Victoria reported exactly the same recharging problem with his IIIc. His original unit had already been replaced (under warranty) last year when the charger malfunctioned in the same way. Now his warranty had expired and he didn't want to pay for a secondhand Palm that he was afraid would fail again. "It seems Palm is no longer standing behind their product," he said.

Palm's Lesley McKnight assured Watchdog there's no recurrent manufacturing fault in the Palm III series and their products are reliable. Each model in the III series uses different technologies, she explained. After helping Carl, she kindly arranged a "new" unit for Dennis for free.

Contact us

WE WANT TO KNOW how IT companies are really treating you. Write to: watchdog@apcmag.com or PO Box 4088, Sydney NSW 1028. Include your full contact details and any product information. All correspondence becomes the property of APC and is subject to editing.

Need to Know Epinions

OpenOffice is a star

Congratulations for distributing OpenOffice 1.0 with July's APC. I have loaded the software with glee on all of my PCs — I have three plus a laptop, yes, a capitalist at heart. After loading the demo version of StarOffice 6.0 beta earlier this year it was going to be interesting to see how this free version would compare. I was quite surprised with the result, and although some Microsoft Office documents were not read by the program, it nonetheless did a good job for the price, excellent in fact.

I will be purchasing StarOffice 6.0 after a few of the bugs have been taken out of the system. Knowing that Linux is getting better and better, I will soon migrate to it totally. It's a pity though that both products don't come with a database.

David Hough
Wallsend, NSW

To be fair, there was a minority of readers who reported mixed experiences with OpenOffice, but we're glad that so many embraced the suite.

TELSTRA TONGUE LASHING

I was very disappointed when I read your article on what is wrong with broadband in Australia (APC July, page 74). The main problem is Telstra, yet your article managed to skirt around this issue and continue to quote the same rhetoric that Ziggy Switkowski spews out to appease Senator Alston and the likes. I always thought (or at least hoped)

that APC was an unbiased publication. Well unfortunately it appears it is not. Again just another marketing machine in the pocket of Telstra. Bah! When will we get a fair broadband deal in this country?

Ian Foletta
Hawthorn, VIC



DEFENDING MICROSOFT

It's easy for people like the reader in last month's epinions (APC August, page 26) to jump on the Microsoft-bashing bandwagon, but it's harder to provide a substantive alternative to the average user. Not all of us are ready to adopt Linux or the sundry other watered down alternatives. It may be fashionable to give Windows and all its incarnations some stick, but let's remember that for all its faults and annoyances, the vast majority of PC users worldwide are familiar with its interface and how it works.

Naina Chunagi
Quakers Hill, NSW

CANNING THE SPAM

I read with great interest your article about spam and how it is likely to take over the Internet (APC August, page 18). Unfortunately, one of the most logical solutions appears to have been missed in the article. Simply remove the Web site that is being advertised in the spam. Say you receive spam asking you to click on www.ilovespam.com so you can get a free mortgage. All an authority needs to do is permanently kill the address. This makes all the spam in the world completely pointless.

I hear cries of foul play, but seriously folks — how many times does a reputable company send out spam? And how many times does a spammer advertise a company that has not engaged their services? This prevents a spammer creating an account, sending out emails till the account is killed and then creating another account and doing it all again.

Well, sure it doesn't prevent it, but it makes it pointless. If it is pointless the spammer is unlikely to be paid — and then they stop advertising for that client. It is very easy to identify spam, we all know what it looks like, and it is equally easy to push a few buttons and get a Web site address deregistered.

There is also the argument that another Web site is simply created, but I don't think this would happen in the majority of cases as it is too complicated to create the site and spam it — in any case, it could be deregistered in less than 24 hours. Makes the effort hardly worth it.

Matthew Wren
Airport West, Vic

Letter of the month

I'm writing in response to Mr Sykes' budget breakdown for what it would cost getting broadband (APC July, page 74). He talks about comparing the cost of a second phone line using narrowband, versus the cost of a free line using broadband. I've done my homework — I can't afford either. I use one line and narrowband — if anyone wants to call me, they try again later when I'm off the Net. If they brought the price of broadband down to about a third (or less) of the cost it is now, I might consider.

Mr Sykes must remember that owning a computer is very expensive. The hardware is expensive and the software is exorbitant (legalised robbery in my opinion). When I think computing I think in overall cost, not just the cost of one item or part. The computer (Mac) I have now was out of date only a few months after purchasing it (my fifth PC). Will I have to buy a new Mac in a few years' time? Will it have a new operating system? Will I have to upgrade the software I have now? You know the answer to that!

I won't spend money where I don't have to and for me, broadband is too expensive an option.

Vaughan Willis
Brendale, QLD

Despite raging for some time, the debate over broadband costs in Australia is just getting started.

Vaughan's Letter of the Month prize should help ease his broadband woes. Vaughan will receive a compact Cruzer USB Flash memory reader, supplied by FlashMemory (www.flashmemory.com.au) with a 128MB SD Card, valued at \$308.





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RaQ4	450mHz	128MB	40GB	\$1,349	\$4,490
RaQ550	1GHz	256MB	40GB	\$1,649	\$5,490
RaQ550	1GHz	512MB	2x80GB	\$2,249	\$7,490

Dell PowerEdge 1650 with Redhat Linux

model	RAM	hard drive	quarterly	annual
PIII 1.13 GHz	256MB	18GB	\$2,500	\$8,600
Dual PIII 1.13 GHz	512MB	2x18GB	\$3,300	\$11,300

Dell PowerEdge 1650 with Windows 2000

model	RAM	hard drive	quarterly	annual
PIII 1.13 GHz	256MB	18GB	\$3,000	\$10,200
Dual PIII 1.13 GHz	512MB	2x18GB	\$4,000	\$13,600

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Need to Know Epinions

A novel idea, but how long before competing sites would start spamming the opposition in an attempt to get them "Web blacklisted"? And who would enforce such a measure? Still, this idea is not as ludicrous as the thought of spam companies suing people who "name" them online.

ADSL AVAILABILITY

A lot has been said about the slow take up of broadband and the extensive advertising that Telstra has embarked upon. I run a business from a home base and I would love to take it up, and I don't even mind the expense, but I just cannot get it.

My exchange (Cannington, West Australia) has ADSL, but Telstra has told me that the particular wiring to my office, or some component on their side, prevents me from getting a connection. Now I understand that ADSL is a relatively new technology, and there is bound to be some hiccups, so I am prepared to wait. For how long? That is the real question. No one at Telstra could tell me, and no one could even point me in the right direction to see what it is that needed fixing, or how long it would take.

Surely there must be some form of strategy in place, some timetable for equipment or lines to be changed to allow for a greater uptake of broadband — but no one is talking to the public about it.

I feel like I am in the technology wilderness. WA has little or no cable, limited wireless coverage, and who wants satellite with a paltry 32Kbit/s modem connection. If Telstra wants a better ADSL take up, all they have to do is make it available.

Tony York
Cannington, WA

PAIR GAIN PAIN

Every time I hear (or read) an advert for broadband I get frustrated — among other emotions. I'm an IT professional, I want broadband at home but can't get ADSL or cable. I live in a relatively new suburb, Aspendale Gardens, and Telstra has no idea when the sub-exchange will be enabled for ADSL. To compound matters, the second line which I had installed (for Internet use) was placed on a pair-gain system without my knowledge. The

fastest connection speed is 28.8Kbit/s so you can imagine how this made me feel. What a joke

Ian Foletta
Aspendale Gardens, VIC

TELSTRA BROADBAND FUND

As a business owner always looking for funding opportunities for projects, I was excited when I heard of the Telstra Broadband Fund. My initial excitement quickly turned to bemusement when I read the details in full. The Web site for the fund says in its introduction: "In all categories, the Fund is looking for exciting and adventurous projects that are unique to the Broadband environment, can be commercialised in Australia, and will stimulate the uptake of Australian Broadband services."

Great, I thought, that sounds pretty good! But then further on Telstra state: "Applications for projects enhancing the technical delivery of content are eligible, but not for the creation or distribution of content." What the? was my next thought.

Maybe my thinking is a little simplistic, but surely the creation and distribution of content that requires broadband would, by its very nature, encourage uptake of the technology? Particularly if, to use Telstra's own words, it is "exciting, adventurous and unique"

Whilst I understand and agree that the creation of new tools and technologies is to be encouraged and supported, on the Web, content is king. Of course the Web is only one part of the Internet that broadband can be used for, but

Have your say

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Letters can also be submitted online at apcmag.com
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Agenda:

your place to vent

I have been working in IT for approximately six-and-a-half years now and have noticed that major manufacturers are so caught up in producing fresh new gizmos and technology that items such as the MiniDisc don't get put to their full potential. Sony are focusing on expensive Memory Sticks for data storage, but what about storing data on a MiniDisc? They can store about 650MB and only cost about \$2 each, are smaller than a CD, and in my opinion less prone to being scratched or damaged.

This would make an ideal replacement for the current 1.44MB floppy disk which is a 1950s IBM product and really worth less in today's computers.

Match the MiniDisc with CDR, CD-RW, DVD-R, USB storage or Zip disk and you will find that it all adds up, so WAKE UP SONY!! You're sitting on a goldmine and don't even know it.

By the way, great mag. I have been a subscriber to your magazines for four years and still never hesitate to renew my subscriptions.

Rick Scucchia
Melbourne, Victoria

Have your say on the new APC
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surely it would be one of the more significant. For a moment there, I thought Telstra really were going to do something for my segment of the industry, but alas — it is not to be.

Sean Heylen
Adelaide, SA

CORRECTION: TOSHIBA TECRA 9100

Last month's review of the Toshiba Tecra 9100 notebook (August 2002, page 74) accidentally carried a photograph of the Toshiba Satellite 1900 model.

The review also stated that the Tecra 9100 used Harman Kardon speakers, which is not the case.

Also, the telephone number given for reader enquiries was incorrect — the correct number for information on Toshiba notebooks is 13 30 70.

APC apologises to readers and Toshiba for these errors.



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Matrox reloaded

Matrox triples the fun with support for three monitors, but can it keep up with the competition? Justin Kranz and David Lin investigate.

Dictionary.com lists Parhelia as "a bright spot sometimes appearing on either side of the sun, often on a luminous ring or halo." In other words, Matrox has named its latest chunk of video silicon after one of mother nature's own visual effects. APC suggests an alternative name: "the Zoolander". Because, just like Ben Stiller's airhead fashion model character in the movie, when compared to the competition the Parhelia looks great but it's a little slow.

By now all the hoopla over the Matrox Parhelia-512 has settled and as our benchmarking has shown, the speed of the card can't compete with a GeForce4. In fact, it doesn't even compare favourably to a decent Radeon 8500. Surely, after all the flashy demos Matrox would have something meaty to substantiate its talk of "High Fidelity Graphics." They do, but the DirectX9-compatible Matrox solution may not be everyone's ideal choice.

THREE'S A CROWDED DESKTOP

Matrox's ace in the hole is what it terms "surround gaming." Not for the faint of heart, the Parhelia's triplehead technology allows for three monitors on your desktop, making a twin monitor setup look positively old hat.

In practice, it's mainly the flight sim (Microsoft Flight Simulator 2002

supports the three monitor setup already) and racing market that will make the most use out of the extra screen capability. Quake3 engine-based titles support the technology as well.

In first person shooter titles, the extra screens add atmosphere and depth, but are best as peripheral vision tools as opposed to separate viewing windows. While APC isn't as rapturous as Matrox over the applications and increased fun factor of having three monitors on your desktop, it's something that is definitely a step forward, and indicative of Matrox's value-add approach.

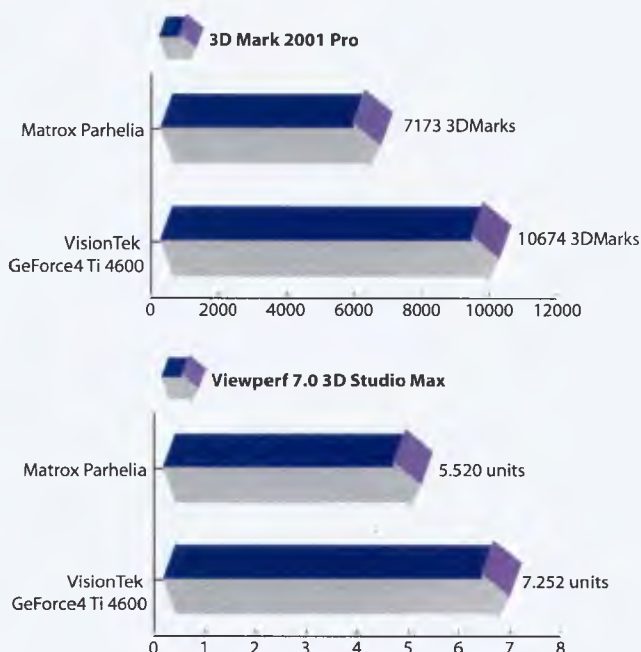
The performance hit isn't as bad as expected. In effect, running three separate views on Quake 3 engine games — the most demanding engine currently supported by the cards' triple monitor mode — run quite smoothly, even if the side panels' views are slightly skewed.

GE-FORCED INTO SUBMISSION

In testing across a variety of resolutions on a 2.4GHz PC, when running Quake 3 the Parhelia pulled in a trifle over half the frames per second of a GeForce 4 Ti4600. Just to make sure, we put the Parhelia through its paces through part one of the America's Army (AA) game. Why this game in particular? Because AA uses the Unreal Tournament 2003 engine, which is another game that will make gamers look into their wallets for a video card upgrade. Again, the results were overwhelmingly in favour of the GeForce4.

It was a concern that some scenes at 1,280 x 1,024 resolution on AA caused sub-30 frames per second (fps) stutter, and usually hovered between 30 and 35fps, compared to the GeForce4 Ti 4600's 55 to 60fps.

No major surprises here, but the concern is that even if the performance of the Parhelia is acceptable for games right now, it's struggling to hold 30fps at a decent resolution in new engines such as the one featured in Unreal Tournament 2003.





This means that in a gaming sense the future doesn't look too bright for the card. However, spotting the difference in action between the Parhelia's 16x anti-aliasing and the GeForce4's 4x AA is a hard ask and the image quality in motion looks very similar.

Matrox's flexibility and hardware support for intensive graphical tasks is a boon — for those titles that support it. Similarly, DirectX 9 vertex shader support is all well and good, but relies on applications making use of the technology. This approach means that Matrox can be put in the unenviable position of providing hardware support for some groundbreaking features, but with minimal software support for these features. Surely buyers would like to see their video card's features utilised in software before they make their purchase.

The biggest test for speed and image quality as a differentiating factor is in higher resolutions. The Parhelia's claims of superior image quality are all for naught if the card can't output smooth visuals at a high resolution.

DDR: DESKTOP DONE RIGHT

In terms of high-end desktop applications and cool add-ons, the Matrox remains an attractive package. With a possible one billion colour display, the Parhelia is one desktop solution that will not age quickly. Matrox's dedication to providing the highest standards of visual quality are evident in their technological approach, which cannot be faulted. Glyph anti-aliasing is the hardware accelerated equivalent of Microsoft's font smoothing technology, which makes for a more readable desktop.

Texture filtering is also given a hardware boost, Matrox claiming that dynamically allocated samples allow a jump from the likes of bi-linear filtering to tri-linear with no performance penalty.

DVD playback is excellent. Then again, \$1,000+ buys a pretty decent DVD player. Hardware acceleration removes most of the jitter and occasional stutter of software solutions. Matrox's filtering

technology and desktop quality ensures a rock solid picture, even in scenes with rapid panning movement.

PLAYING THE PARHELIA WAY

Interestingly, Matrox has delivered much of the Parhelia's literature in the context of gaming. Press releases discuss the high-end gaming market, quote game developers praising

Matrox's Hardware Displacement Mapping technology, and wax lyrical over the card's three

monitor "surround gaming" functionality.

It's quite obvious why, the games market is a very influential factor in video hardware sales. Next year sees the release of Doom III, widely held to be the next "big" 3D engine that will be used as a performance benchmark. The game's engine is designed to give next generation video cards a workout.

Doom III team leader John Carmack has been quite direct in his comments on the Parhelia. "The executive summary is that the Parhelia will run Doom, but it is not performance competitive with nVidia or ATI," id Software's head honcho explained. "None of the special features will be really useful for Doom," he added.

The twin DVI outputs supported by the card also may have gamers with standard output cables puzzled.

The Parhelia is no chump in the fight for the video card dollar. But if you're keeping an eye on the future of gaming, and high frame rates in particular, you will be better served elsewhere. ATI's 9700 chipset looks even more powerful than the GeForce 4 Ti4600, and with nVidia's NV30 and 3DLabs' P10 chipset also causing a rumble there's no shortage of competitive choices both now and in the near future.

However, if you're looking for a solution offering excellent visual quality in both 2D and 3D modes, with super-fast frames in cutting edge gaming applications a distant priority, the Parhelia warrants inspection — if you can swallow the price. **EDIT**

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Noteworthy contender

Fujitsu's Transmeta-powered featherweight sub-notebook pulls out all the stops to trim weight and stretch battery life. But at what cost?

Notebooks are in the spotlight and for good reason. There's never been such a choice of purpose-built mobile chips available. Consider Intel's Pentium 4-M, III-M and Mobile Celeron; AMD's mobile Athlons and Durons; and Transmeta's Crusoe. And while the Pentium 4-M earns all the plaudits for raising notebook performance to a higher level, you're not likely to see this class of processor inside any notebook lighter than 2.5kg.

Additionally, the premium price of the Pentium 4-M chips puts pressure on the price of every other chip, so there's value in Pentium III-M and other types of notebooks, especially if you don't need the P4-M's grunt.

Fujitsu's LifeBook P2110 is similar to the Sony Vaio C1MT (reviewed in *APC* August, page 64). With a frame measuring 270 x 178 x 40mm (WDH) and weighing in at 1.5kg, the P2110 has all the credentials expected of its larger siblings, but without the bulk. It rates higher in performance to the C1MT but lacks some of the sexy extras that make the Sony so appealing.

Like the Sony, the P2110 also uses a Transmeta Crusoe CPU (the TM5800) which clocks at 867MHz. This is a tad faster than the C1MT but it's nowhere near the processing power of the Pentium III-M notebooks. Most features are comparable between the two competitors, but where the P2110 comes up trumps is with its built-in DVD-ROM/CD-RW combo drive. The drive makes

software installation considerably easier, although it does come at the expense of power consumption.

On the other hand, the choice of bundled CD burning software, called Drag & Drop CD, is appalling. You're better off relying on the rudimentary CD-R capabilities of Windows XP Home Edition, Fujitsu's standard OS, or stepping up to Nero or Adaptec's Easy CD Creator.

Apart from InterVideo's WinDVD player, bundled software is thin, with only some diagnostics and utilities included — again, nothing like the generosity of Sony's software bundle.

However, the LifeBook's battery life is very impressive. Even with minimal power management the P2110 still managed a credible two hours and 12 minutes on our battery

rundown test. With power management enabled, Fujitsu rates battery life at 3.6 hours and you have the option of doubling this by

opting for an extra battery in place of the combo drive. Performance on the P2110 generally surpasses that of the Vaio C1MT, as you would expect from a system using a CPU running 133MHz (or 18%) faster. In normal office productivity applications there's little difference between either Crusoe-equipped notebook. As neither notebook was capable of running 3D Mark 2001 Pro, we were unable to properly test the qualities of the integrated ATI Rage Mobility-M graphics chip — but the anecdotal evidence suggests gamers needn't bother.

The P2110's display is 10.6in diagonally in a wide-screen aspect ratio, giving it a maximum of 1,280 x 960 pixel resolution. The resolution feels odd if you're used to the usual 4:3 aspect of conventional screens and, as the screen doesn't fill out to a 16:9 ratio, it isn't quite optimised for DVD movie playback either. Anyhow, the sound from the stereo speakers (built-in to either side of the palm rest) is inadequate even for hearing the beeps and pops of the Windows sound scheme.

Fujitsu has provided an email hotkey at the side of the display, with other appointments dotted around the magnesium alloy shell including FireWire, USB and Type II/III PC Card slots. The trackpoint feels slow and unresponsive.

Buyers will appreciate the strength, battery life and portability of the LifeBook P2110. The internal combo drive is welcome in an ultraportable notebook, but the feature set is well-matched by most of the models on the street with Intel Pentium III-M CPUs.

Considering the wide range and sharp pricing of PIII-M competitors, most users could forsake the small advantage in battery life and weight for a model with higher performance at a lower price.

David Lin

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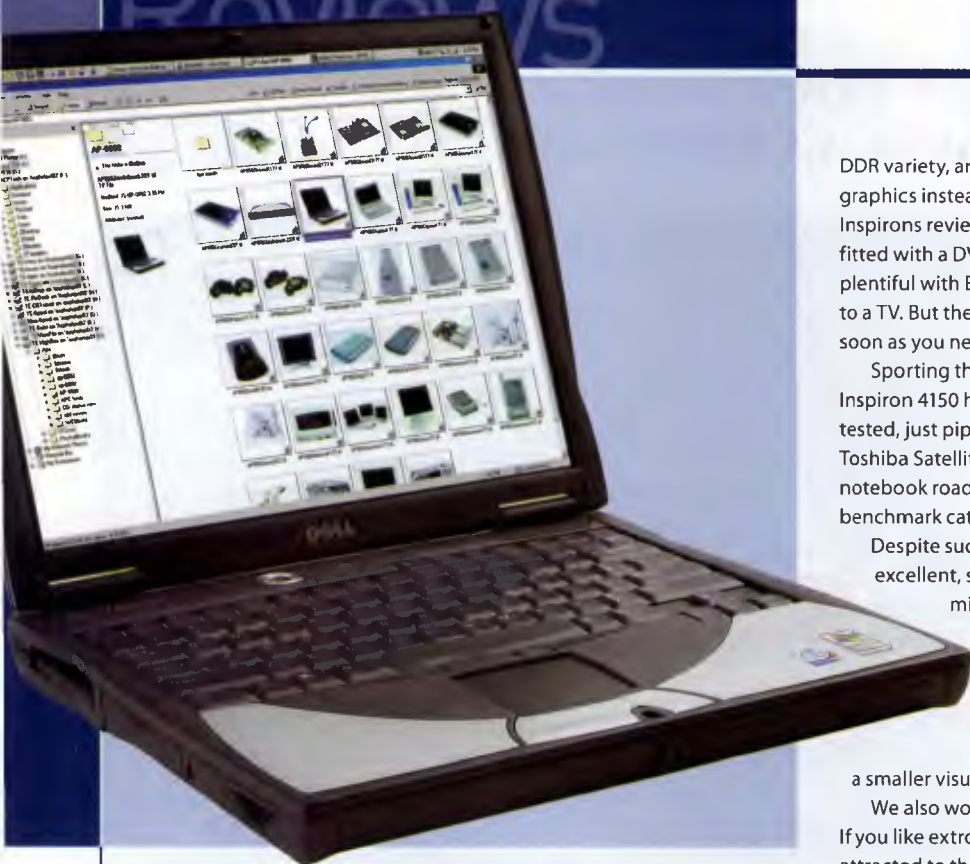
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Inspired choice

Dell claims this is a lightweight notebook packing a heavyweight P4 punch. It's certainly got grunt, but the weight class claim is un-needed hype.

This powerhouse portable easily stands on its own in both raw performance — thanks to Intel's 1.9GHz Pentium 4-M processor — and value, with a compelling \$4,199 price. However, terms like *thin*, *light*, and *stylish* are subjective, and in the case of the Inspiron 4150, they are used a little too much.

While 2.83kg might not be significant in the notebook category overall, it's certainly not what we'd consider lightweight. And almost 37mm in height can't be regarded as *thin* by any stretch of the imagination.

No matter what kind of spin is put on it, the Inspiron is simply a speed-oriented notebook in the classic mould of... well, speed-oriented Inspiron notebooks! And we'd seen enough of those to know what to expect from the Inspiron 4150.

High performance, low cost and plenty of features: that should be Dell's mantra here. Trying to pass it off as a thin and light portable merely dilutes the best attributes of the 4150.

Our review unit was configured with a larger 40GB hard disk which bumped the standard spec 20GB model up by \$100. RAM is 256MB of the

DDR variety, and Dell has opted for ATI's Mobility Radeon 7500 for graphics instead of the nVidia-based solutions found in the two Inspirons reviewed recently (APC August, page 62). This unit was also fitted with a DVD/CD-RW combo drive. Ports and connectivity are plentiful with Ethernet, modem and S-Video out so you can connect it to a TV. But the single USB port is a miserly move that will annoy you as soon as you need to plug in your second USB device.

Sporting the fastest mobile processor we've seen to date, the Inspiron 4150 had the highest Winstone score of any notebook we've tested, just pipping the 1.8GHz IBM ThinkPad T30 and the 1.6GHz Toshiba Satellite Pro 6100 — the equal-billing champs from last issue's notebook road test. The 4150 handled itself impressively in most other benchmark categories.

Despite such blistering performance, battery life proved to be excellent, sustaining the 4150 for a lengthy two hours and 42 minutes under the demanding Batterymark tests. This is also up with the best of any notebooks we've seen.

Although brightly illuminated indoors, when left in its native setting we found the 14in LCD panel, with its odd 1,400 x 1,050 screen resolution, became extremely difficult to see outdoors. Notching it down to a smaller visual footprint such as 1,024 x 728 is recommended.

We also would question Dell's description of the 4150 as stylish. If you like extroverted, boy racer bits on your car, you'll certainly be attracted to the 4150's interchangeable plastic "accents". As long as your taste leans towards Dell's options of Burlwood, Robin's Egg Red and Iridescent Jade, you can snap these onto the palm rest and the rear of the display panel.

If the engineers at Dell were truly interested in designing a slim profile for the 4150, then leaving the raised accent off the back of the display, along with the equally raised and oversized Dell badging, would've been a good start.

The touchpad and trackpoint cluster also suffers from heavy-handed styling, wrapping the pointer buttons around the space bar in a curve to maximise the size of the left button. The rubber padding on either side of the trackpoint buttons, however, is a nice touch. The keyboard is nicely weighted if not a little light, and the ample 3mm of key travel makes for fluid keystrokes.

A more functional design problem is the latch that holds the display down when the notebook is closed. It doesn't actually hold the lid firmly to the base, which causes it to rattle. For example, if you left it on a car's passenger seat while driving.

Also, the display top feels like it could do with a little more reinforcing, and the flex isn't helped by the snap-on panel design. Oscillating the display panel while the screen is on reveals a ripple distortion effect at certain pressure points around the LCD array.

Those physical shortcomings are what pulled it back from an Editor's Choice award. Apart from that, and the mixed marketing message, the 4150 has plenty going for it.

Simon Tsang

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Verdict ●●●●○





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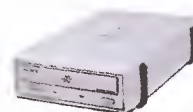
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*Source: IT Market Insights Feb '02



Office Svelte-down

When populating your office with PCs and their economies of scale, "barebones" systems prove a cost-effective and standardised alternative to custom-built desktops.

Traditional small OEMs, the computer stores that exist as shopfronts across the country, build their PCs by sourcing commonly available computer components through a well-defined supply channel.

Basic considerations are a chassis (usually with a power supply already fitted), motherboard, CPU, memory, floppy and hard disk, optical drive (CD-ROM or DVD-ROM), and expansion cards for audio, graphics and networking if these are not available on the motherboard. Add a keyboard, mouse and monitor and anyone looking to build a PC had better sort their lines of supply as each of these components could mean a different supplier.

One way around the supply of bulk PCs is to use what are known in the industry as "barebones systems", usually consisting of a case, power supply and motherboard matched together, assembled and shipped as a unit. From here, the CPU, memory, storage, software, monitor, keyboard and mouse are added before it ends up on a desk.

The benefits for the OEM flow on to the end user. With a barebones system the OEM does not have to match so many components. Subtle things like dodgy power supplies, poor case ventilation, ill-fitting motherboards are taken out of the system builder's hands. It also makes outfitting bulk orders like a corporate,

government or education rollout easier to manage. Such systems are tailor-made for bulk orders of uniform machines although there's nothing to say the PC we have here would not fit into a modest home office situation. Best of all the overall cost of putting together a system using a barebones is usually less than if everything was built from scratch.

Hallmark, one of Gigabyte's main distributors, are in an advantageous position as they are already geared for handling product lines in bulk.

Their Viewmaster Svelte series started out as Gigabyte's G-Max FA5CB barebones model consisting of: the GA-8ILFL motherboard, floppy drive and 52x CD-ROM. Hallmark then fitted

a 1.8GHz Celeron CPU, 20GB 5,400rpm Seagate ST320410A

ATA/100 hard disk and 128MB of PC2100 memory. Because the GA-8ILFL board is based on the 845GL chipset, the graphics adaptor, audio and NIC are already integrated. This makes the savings even greater as the OEM doesn't have to fork out for these components. The integrated approach doesn't leave much room for expansion, with only three PCI slots, two DIMM slots (one is occupied already by the single 128MB DIMM) and no spare drive bays. As with all 845GL designs, the option of fitting a third-party AGP adaptor is not available as there is no AGP slot.

Completing the system is a Viewmaster (Compal-OEM) 15in LCD monitor and Gigabyte keyboard and mouse. The monitor is ordinary by most standards, although it does include built-in speakers. Hallmark installs Windows XP Professional on the hard disk before it leaves their production facilities.

Despite the "Svelte" moniker, it's not a flashy-looking unit, but the slim design and LCD monitor instead of a bulkier CRT makes it attractive for restricted office space.

This is not intended to be a high-performance unit. These PCs are only meant to handle basic office productivity applications. Benchmarking was only able to be completed after an extra 128MB of RAM was added.

The internal DVT graphics of the 845GL appropriates 8MB of the system memory for graphics. This only leaves the system 120MB, too skinny for some of APC's benchmark tests.

The Svelte series is an attractive proposition for the corporate or education sectors. The barebones concept works well in this instance in producing a neat, serviceable desktop with a complete feature set including front-mounted USB ports and a LCD monitor for \$2,200.

David Lin

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Verdict ●●●○○





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Too little, too late

Siemens tries hard with its Pocket PC GPRS handheld, but in the end this is just another "communicator" — and a disappointing one at that.

There's a war going on around your waistline, but it's not the battle of the bulge. This is a war for the scarce real estate occupied by mobile phones and handhelds. Rolling those two products into a single "communicator class" device is nothing new. It has been tried by phone companies — most successfully by Nokia — and handheld vendors alike.

Siemens' entry into the beltware war, the SX45, starts off with good intentions by offering GPRS for high-speed data access across the GSM network. GPRS has a natural appeal for the digerati who crave constant go-anywhere access to the Web and email, so you'd expect the SX45 to be the right product at the right time.

Unfortunately, both for Siemens and their would-be customers, the SX45 is already teetering on the brink of obsolescence. Rather than use their own extensive experience in the mobile phone arena to craft a unique product, Siemens chose to adopt Casio's Cassiopeia E125 as the hardware platform. This is very much last year's technology.

The 150MHz MIPS processor is totally outpaced by the latest 400MHz ARM powerplants, which were themselves designed with processor-intensive telephony in mind.

Also, the SX45's compatibility with future Pocket PC software releases is questionable. Microsoft has specified ARM processors as the standard for all Pocket PC 2002 hardware — in part, to overcome the problem of developers needing to compile applications for a range of processors. It's possible that non-ARM support in third-party applications will dwindle, leaving owners of the SX45 in the cold.

LOW RAM, SLOW CPU

The SX45's 32MB of RAM is inadequate for storing anything more than a handful of MP3s and some digital photos. We consider 64MB of RAM to be the minimum for a Windows-powered handheld.

This underpowered spec, in turn, anchors the SX45 to Microsoft's Pocket PC 3.0 operating system rather than the latest PocketPC 2002 version. Considering that PocketPC 2002 is a superior platform for wireless connectivity, including built-in VPN support, the choice of OS is also out of step with the task Siemens has set.

In its favour, the SX45 offers some room for hardware expansion through a pair of CompactFlash and SD card slots, although it's not possible to use cards in both expansion slots at the same time.

The 320 x 240 TFT touch screen has gorgeous clarity and resolution as long as you stay indoors, but as with any non-reflective screen you'll be flying blind once you step into the sun.

The audio quality is impressive. The supplied headphones have a reasonable frequency range, certainly good enough for listening to MP3s on public transport. A button is located on the microphone clip for call pickup/disconnect, but no volume wheel.

The integration of GPRS into the device is smooth. If a voice call comes through while you're browsing the Net, an alert comes up on the screen so you can choose to answer or reject the call; answering pauses your browsing session until the call is over. It's a valuable feature as there is no interruption to your normal GSM service while browsing, and no missed calls while you're online.

The frightening thing about GPRS is the data download cost. Carriers currently charge around 3.3 cents per KB — that may not sound like much, but check your email account a few times and check out a few Web sites and it quickly adds up. In two short and undemanding sessions we clocked up 1.5MB of data, which added \$50 to the bill.

Strangely enough, there appears to be no way to load phone number entries from your SIM card into the contact database.

We were also disappointed with the inability to use the SX45 as a phone without the supplied headphones. In the time it takes to realise the phone is ringing (there's no vibrate feature), locate the headphones, plug them in to the SX45 and your ears, the caller could have hung up or been put through to voicemail.

If GPRS became affordable, you'd expect combo handheld/phone devices to start appearing on the belts of the connected set. But the SX45 won't be among them.

Ben Menge

<< Details

Contact Siemens Australia

Phone 137 222

Online www.siemens.com.au

Price \$2,199

Verdict ●●○○○



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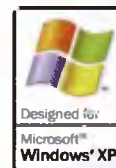
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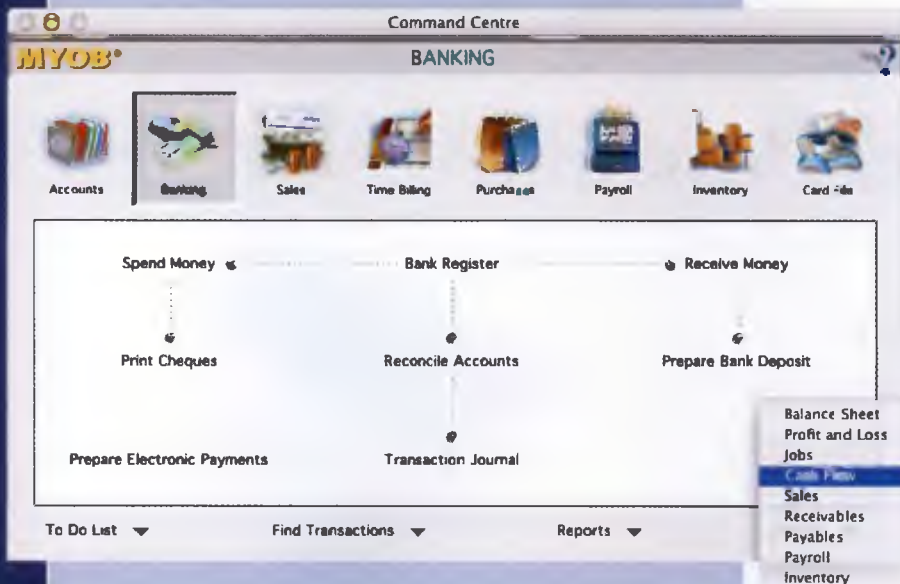
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► AccountEdge's clean interface allows easy access to a variety of report options.

AccountEdge 2.0 acknowledges that different businesses have different banking habits. For example, you can deposit cheques in one batch and then divide the funds between individual customer debts — ideal for businesses with thousands of one-off customers orders. You can also match each cheque against a particular debt and deposit them as you go, a method better suited to managing a smaller number of customers with more established relationships.

Such flexibility is useful, but it can also be dangerous if you start down a bookkeeping path that will not meet all your needs. Never before has the dictum "read the manual" been more apt. Think hard before you enter your first transaction into AccountEdge 2.0 — after all, there's a reason why MYOB consultants have become an industry in their own right.

AccountEdge 2.0 comes with payroll, time-billing and inventory-management abilities, which ensures its relevance to every type of business from a wholesaler to a personal trainer. Other conveniences include support for multiple currency types and the ability to both trigger electronic payments through online banking sites and to import electronic bank statements.

One oddity of the consistent and cheerful interface is the behaviour of default buttons in dialogue boxes. In most Mac programs, clicking the default button in a dialogue box performs an action (such as saving your changes) and then closes the window. However, AccountEdge 2.0 leaves the dialog box open, which will probably see users clicking the button again and again.

Nonetheless, once you get used to toggling between several open dialogue boxes using keyboard shortcuts, you'll find AccountEdge 2.0's idiosyncratic mode of operation quite useful. Especially useful, the dialogues remember default settings for the particular customer, product or account, as well as the most recently used settings.

A few shortcomings don't prevent AccountEdge 2.0 from fulfilling its basic goals, making it a good choice for any Mac-powered small- or medium-sized business.

Steven Noble

Mac money matters

MYOB's quirky new accounting system for the Mac is far from perfect — especially under OS X — but manages to deliver results where they're needed most.

Having begun as an Apple-only program some 13 years ago, the popular accounting package MYOB has returned to its roots with AccountEdge 2.0, a new bean-counting bundle for the Mac.

AccountEdge 2.0 is powerful and well rounded, and while not all of its features work on OS X, there's more than enough to keep the red ink off your ledger. The program's clean interface makes light work of the chores of double-entry bookkeeping, which will help keep you on the right side of the ATO, especially when it comes to balancing entries such as GST Collected and GST Paid. This in turn allows AccountEdge 2.0's BASLink system to automatically fill in your BAS statement and submit it online to the ATO's e-commerce system. While it's disappointing that BASLink doesn't work under Mac OS X, the program's GST reporting was solid enough that manual completion of a BAS took just two minutes. Other features disappear under MIA from OS X, such as multiuser capabilities and faxing, will be more sorely missed.

A wide set of reporting options churn out everything from standard balance sheets, sales histories and payroll summaries. These reports can be redirected to Excel, along with certain form letters to Word. One improvement we'd like to see would be exporting of invoices and receipts into Word, rather than restricting the user to AccountEdge 2.0's rudimentary layout tools.

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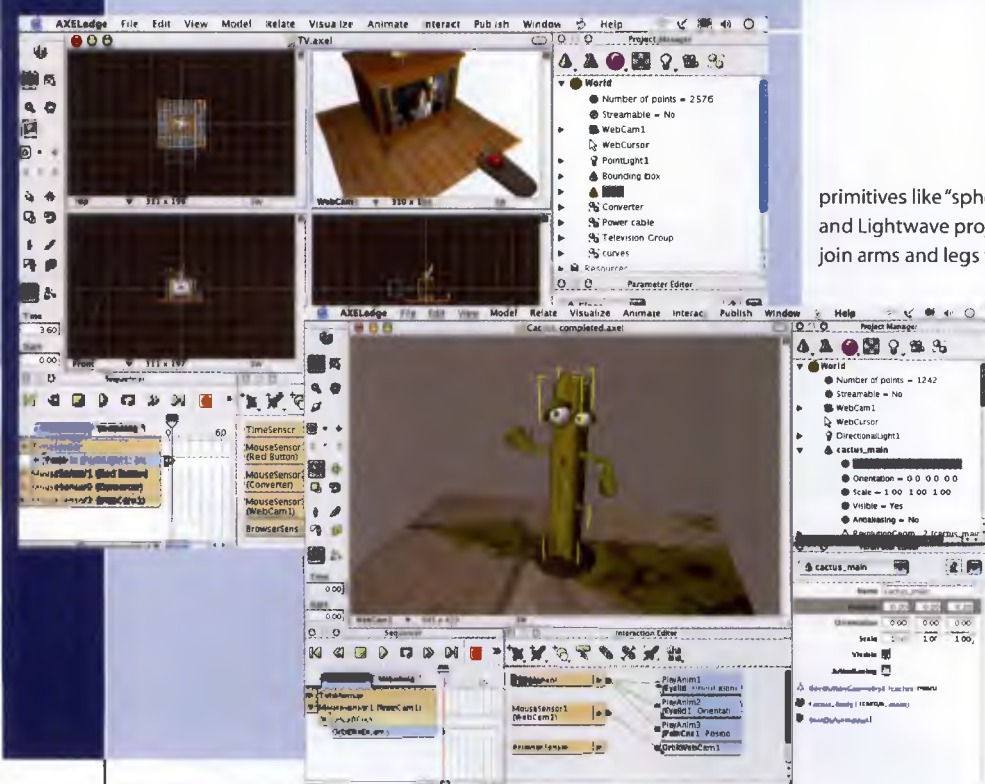
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3D dynamo

AXELedge adds a welcome dimension to authoring 3D content for the Web — providing you can afford its hefty price tag.

3D on the Web has been tried many times before: VRML, Adobe Atmosphere, ActiveWorlds, even Shockwave3D. None of these have ever stuck, either because of unrealistic system requirements or the need to download huge viewer plug-ins. Despite the failures, software companies continue to put products to market, the latest being MindAvenue's AXELedge 1.5.

What does AXELedge have that previous offerings lacked? For starters, it's reasonably simple to use — animation and interactivity can be added without the need for handwritten code. This means that designers can create a project without having to share the workload with a dedicated programmer. The AXEL Player is only a 600KB download and to top it all off, AXELedge and AXEL Player both run briskly on Windows and Mac.

MindAvenue maps the AXELedge workflow as: modelling, relations, visualizing, animating, interacting and publishing. In reality, these steps are mixed together rather than performed separately, but the distinctions between them are useful.

Models can be single 3D surfaces or complex groups. They can be generated from hand drawn or imported curves, built with ready-made

primitives like "sphere" or "cone", or even imported whole from VRML 2 files and Lightwave projects. For character modelling, one and two-bone limbs join arms and legs to a central body.

Once models are in place, relationships between them are used to create realistic behaviours. For example, a drawer in a virtual kitchen might be constrained to slide in and out, or a tap to rotate about an axis. There are a number of constraints to choose from, including bounce, spring, and a variety of joints (useful for creating articulated machines and controls).

The application of lighting takes some getting used to, as does the variety of texture modes and types (make no mistake, this will take time to master). Textures can be made up of static graphics, movies or even reflective surfaces to create a metallic or glass-like appearance. The addition of imported graphics can significantly increase the size of a published World file, especially when movie files are involved.

ANIMATION AND INTERACTION SYSTEM

Animation is achieved by recording snapshots of the action, from which the computer interpolates the in-between frames. AXELedge also offers automated wave motion, angle changes, material changes, particle generators, sound playback and even tooltips. Each of these reactions can be linked to triggers such as time, mouse clicks, download progress, object proximity, and custom triggers of your own design.

Once a World is animated and ready to roll, the publishing process is quite simple. AXELedge optimises the 3D content into a .axs stream file, and creates an accompanying HTML file if you so wish. AXEL Player takes advantage of regular HTTP streaming, so there's no special server software or preparation required. Just transfer the exported files to a Web server, and be sure to link to the Player download page. The number of Web surfers with AXEL Player is bound to be quite low, so its small size is a bonus.

Although AXELedge is a sweet product, we noticed some hiccups. The review copy we tested consistently took more than three minutes to launch under Mac OS X. It started up in seconds once we booted into OS 9, and (once running) performance was roughly equivalent on both systems. Also, pay attention during installation as to where the sample projects are being installed, as this differs according to your current operating system.

AXELedge's comprehensive documentation almost makes up for the lack of context-sensitive help. There is a massive 180-page training manual included, in paper and PDF format, which will quickly get you familiar with the program. And that's without specific 3D experience. There's also a 370-page user manual for all the remaining details.

AXELedge 1.5 is a pricey but compelling purchase. Those without \$2,000 to spare should look out for its cheaper sibling, AXELcore. For \$917 it offers the essential capabilities of AXELedge.

David Emberton

<< Details

Contact Future Reality Australia

Phone 02 9906 5455

Online www.future.com.au

Price \$2,177

Rating ●●●●●

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Calling the shots

Can Fuji topple Sony's Cyber-shot DSC-F707 in the battle of the big lenses?

Fuji's FinePix S602Z is built around a Fujinon 6x optical zoom lens, equivalent to 35-210mm on a 35mm camera. A quality piece of glass, in this respect it's similar to the class-leading Sony F707.

Fuji claims that the S602Z is capable of recording up to 6.03 megapixel images, which can be misleading when compared to the 5 megapixel CCD of the Sony F707. In reality, the FinePix S602Z has an effective picture-taking capacity of 3.1 megapixels. Achieving the 6.03 megapixel also takes longer to write the image to memory, with an average file size of around 18MB. Regardless of the

resolution, the Sony is the faster camera of the two, quickly releasing control to the user after a shot.

Images are stored on either SmartMedia wafers or IBM's stamp-sized 340MB and 1GB Microdrive through the camera's Type II CompactFlash slot. Shutter speed gets down to a swift 1/10,000s, with full motion video capture at 640 x 480.

ISO control is impressive, with choices of 160, 200 and 400 through to settings equivalent to ISO 800 and 1,600. Sadly, you can't use the ultra high settings of 800 or 1,600 on anything larger than a one megapixel shot.

The 1.8in LCD monitor is clear and fast, providing quick reviews of images taken, an intuitive menu displaying aperture and shutter settings. We found the eye level electronic viewfinder to be sharp and bright, ensuring accurate viewing options in bright sunlight.

A commendable effort, but if you can spare an extra \$700, the Sony F707 delivers true 5 megapixel resolution, faster electronics and superior overall picture taking quality.

Denis Gallagher

<< Details

Contact Hanimex

Phone 1800 226 355

Online www.fujifilm.com.au

Price \$1,799

Rating ●●●○

Sony Cyber-shot DSCP9

Mainstream appeal

The new Cyber-shot DSCP9 is another sign that high-quality 4 megapixel digital cameras are fast hitting mainstream price-points.

At \$300 below the asking price of its bigger brother the DSCS85 (reviewed APC July, page 40), the Sony Cyber-shot DSCP9 caters to a wider audience. It's smaller, simple to use and foregoes features like manual shutter and aperture control, but retains an excellent features-set for its price.

Despite its tiny form, it's not an awkward camera to handle; this feels like a digital camera of substance. It also manages to squeeze in a 3x optical zoom lens that is equivalent to a 39-117mm telescope in a 35mm camera.

With 3.95 effective megapixels at your disposal,

the maximum recording resolution is 2,272 x 1,704. Image quality is superb in most common lighting conditions. For night scenes and shooting subjects in low light conditions, there is a scene selection mode that holds the shutter open longer to capture background lighting. This is a reasonable trade-off to full manual shutter and aperture priority modes, and is much easier to use for the less experienced.

Focus distance can be adjusted via a number of presets in the menu, and finding it quickly to customise a shot on the fly isn't too difficult. The autofocus can also be switched between Center and MultiPoint, based on how wide you want the focus area to be.

More novel features include a Multi Burst mode that records up to 16 continuous shots in rapid succession, and saves it as a single animated GIF file.

The DSCP9 is indeed a high resolution camera to satisfy the masses. It's compact, robust, easy to use and takes high quality images in most conditions. Due to a lack of custom settings there's limited appeal for enthusiasts, but that shouldn't deter mainstream users.

Simon Tsang

<< Details

Contact Sony Australia

Phone 1300 137 669

Online www.sony.com.au

Price \$1,599

Rating ●●●●○

SONY

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Pee wee MP3

Panasonic's tiny SV-SD80 is a top class MP3 player limited by its restrictive transfer method and cost.

Wearable PCs may not be a reality just yet. MP3 players, on the other hand, lend themselves to strap comfortably onto a limb.

Panasonic's e.wear range of MP3 players is designed for such a purpose, and the case of the SV-SD80 it's one of the smallest players we've seen that handles removable flash memory. Measuring just over 44 x 42 x 17mm (HWD), the SV-SD80 comes with an armband (handy for jogging). A hard plastic semi water-resistant case is also supplied and has room for a single AAA battery to supplement the rechargeable unit inside the player. This extends playback to around 50 hours from a standard 18 hours.

Removable memory is a supplied 64MB Secure Digital (SD) card, which can carry about an

hour's worth of MP3 tracks encoded at 128Kbit/s.

The SV-SD80 also plays back WMA and Advanced Audio Coding (AAC) formats, which means almost twice as much playback time at the same quality.

Audio quality with the supplied ear buds is remarkably high, and despite a lack of extensive equaliser settings, the SV-SD80 is versatile enough for decent sound in most environments.

Transfer of music is managed via a special version of RealJukebox software customised with driver support for the supplied USB Panasonic SD card reader.

However, as it has no read/write capabilities this means you cannot transfer music or files directly to the player itself.

The Panasonic SV-SD80 is a quality MP3 player, but its limited ability to transfer and high price combine to

ultimately make this MP3 player less than appealing for the mainstream market.

Simon Tsang

<< Details

Contact Panasonic

Phone 132 600

Online www.panasonic.com.au

Price \$799

Rating ●●●○○

Norton Internet Security 2.0

The dynaMac duo

Use the best features of Symantec's great value Net security bundle for Mac, and you can ignore the rest.

Forget Batman and Robin. Today's Dynamic Duo is antivirus and firewall software, protecting your computer from online super-villains. Not every part of Norton Internet Security 2.0 (NIS) for the Mac delivers but there's enough to make you feel safe at night.

While Norton Personal Firewall 2.0 (NPF) provides a standalone firewall utility for Mac OS 8, 9 and Classic, under OS X it acts as a graphical front end to OS X's built-in Unix firewall. That's not such a bad thing, because while the OS X firewall is powerful it's also a beast to configure.

Symantec doesn't help by not revealing this because if you try to test-drive NPF for Mac OS X while running another ipfw-configuring program, NPF says that it can't start because another copy of NPF is already running.

The rest of the firewall config is a snap. To open a port for outgoing services such as instant messaging or remote control, just select the service from a pop-up menu.

Norton Anti-Virus scans everything from disk files to email attachments without a deep memory footprint. Setting up regular system wide scans and automatic downloads of the latest virus-definition file is push-button simple; online updates are free for the first year and \$26.95 per year thereafter.

New to the NIS suite is Norton Personal Privacy (NPP), although it's also the only member of this tag team that runs only on Mac OS X. It blocks Web page ads well enough: very few slipped past NPP, and those that did were easily added to the blocking list.

Where NPP falls down is that its promise of "stopping personal data from leaving your computer" translates to "stopping you typing things into Web forms". Luckily it's very easy to disable. Also in NIS 2.0 you'll find iClean, which can find and delete cookies along with other files from your hard disk.

All-in-all NIS 2.0 is great value.

Steven Noble

<< Details

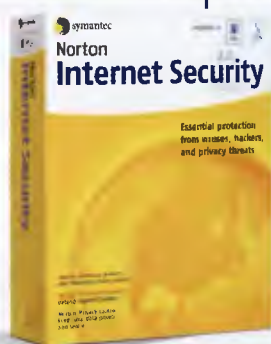
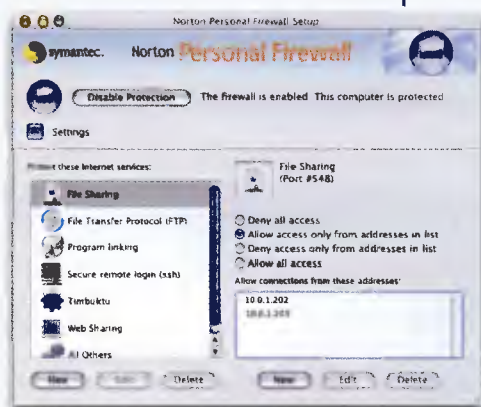
Contact Symantec

Phone 1800 680 026

Online www.symantec.com.au/mac

Price \$159 (\$98 upgrade)

Rating ●●●●○





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56K Modem / LAN, 1394, TV-out, 3 USBs,
Ai-Box Connection
Audio DJ



14.1" TFT LCD

Mobile Intel Pentium 4 Processor-M
up to 1.7GHz
128MB On board, Two SO-DIMM socket
for expansion up to 1024MB (model B)
2.5" 9.5mm IDE HDD, capacity up to 40GB
Built-in modem / Ethernet
Two IEEE 1394 ports, Port-BarII support
Upgradeable 802.11b wireless Lan (Option)



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up to 1.2GHz
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for expansion up to 384MB
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Built-in modem / Ethernet
Upgradeable 802.11b wireless Lan (Option)



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up to 1.7GHz
128MB On board, Two SO-DIMM socket
for expansion up to 1024MB
2.5" 9.5mm IDE HDD, capacity up to 40GB
Built-in modem / Ethernet
Two IEEE 1394 ports, Port-BarII support
Upgradeable 802.11b wireless Lan (Option)



14.1" TFT LCD

Mobile Intel Pentium III Processor-M
up to 1.3GHz
128MB On board, one SO-DIMM socket
for expansion up to 640MB
2.5" 9.5mm IDE HDD, capacity up to 40GB
Media bay for swappable DVD / CD
/ CD-RW / Combo drives (Option)
PortBarII, PortDockII
Upgradeable 802.11b wireless Lan (Option)
Supporting IEEE1394



Not so fast

We've all heard about the myth of red cars being faster than the rest.

SCSI too has benefited from such a speed mystique but, as *Simon Tsang* says, it's not the perfect data pipeline some make it out to be.

SCSI is the red car of the hard disk industry. It's a byword for "high performance hard drive," at least when compared to the ATA spec (more commonly referred to as IDE).

And in the past, that perception largely held true. SCSI technology used to hold a strong upper hand in terms of flexibility and bandwidth over ATA. However, in 2002, it's a very different matter.

The latest SCSI host controller on the market is the seventh generation Ultra320 standard. No prizes for guessing that its bandwidth is 320MB/s. Drives based on this spec will be available by the time you read this. Compare this with the "fastest" ATA currently available — Maxtor's ATA-133 spec designed to pump data through the channel at 133MB/s — and it appears that SCSI is still the undisputed speed king.

So if you've been scoping out the latest SCSI controllers and hard drives with lustful eyes, dreaming of squeezing that last ounce of grunt from your gaming beast, we suggest you think again. Will the hard disk equivalent of a red car really make your PC go faster?

That's not to say that SCSI isn't without its benefits. The spec still rules when you need to serve data over a high-traffic LAN or across the Internet, rather than a single-user or small-network environment.

SCSI benefits from having its own host controller too, which means a hard disk won't be as much a drain on your CPU as an ATA drive.

Although differences in performance aren't quite discernable when only one person is accessing data from the drive, increasing the load by using the PC as a file server will show SCSI to be a far more efficient transport.

If it's just a desktop you're planning to upgrade, stick to ATA hard drives

However, that's not necessarily the case. While SCSI technology continues to progress comfortably in line with Moore's Law, ATA has also managed to extend beyond its early limitations through various iterations of the spec.

While testing hard drives for this month's Labs Challenge, we noticed the existing crop of drives based on the latest ATA-100 and ATA-133 interfaces can give the fastest SCSI platters a run for their money. We dug up the fastest SCSI drive we could get — Fujitsu's Ultra160 MAN3367MC/MP — and coupled it with an Adaptec 39320D Ultra320 host controller. And we set it against the fastest ATA hard disk from the Labs Challenge — the Western Digital WD 1000JB.

Under WinBench 99 Business Disk, the ATA drive managed to better the SCSI by over 10%. It was a similar story in the High-End Disk test, where the difference was 11% on the side of ATA.

Using MDB 95 (Michael's Disk Benchmark), which measures a hard disk's sequential and random read/write speeds, also yielded consistent results in Western Digital's favour.

The only category where the SCSI drive bested the ATA unit was the random cached write, where it scaled 10% higher.

Another advantage of SCSI is its ability to handle up to 15 devices on a single channel. ATA accommodates only two drives per port. In a configuration that requires more than four hard disks, SCSI is infinitely more ideal.

Nor is SCSI merely a hard disk technology. It was designed to be an interface for peripheral devices as well. Before USB hit the big time, the only other ports available for hooking up a peripheral on a PC were the serial and parallel ports.

Typically, printers used the only available parallel port on a PC, leaving devices such as scanners out in the cold. Pass-through parallel ports never worked that well: SCSI was one practical solution, which is why many scanners supported it.

What you need to know is this: don't buy into the "SCSI rules" hype. SCSI is faster only if you have specific uses for its higher capacity architecture. If it's just a desktop you're planning to upgrade, stick to ATA hard drives. They're much cheaper, they don't require an additional controller, they're a snap to install, and — at long last — they'll beat the pants off a SCSI drive. And they don't even have to be red to do it.

stsang@apcmag.com



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Print up to 2880 dpi resolution.
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S300

11 ppm mono performance at a home user price.¹
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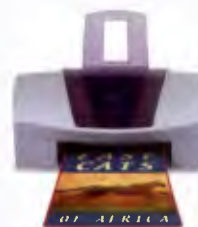
S520

Up to 14 ppm A4 mono.
Up to 9 ppm colour.¹
\$449^{RRP}



S750

Up to 20 ppm A4 mono.
Up to 13 ppm colour.¹
\$549^{RRP}



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Canon



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S820D
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S900
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Bubble Jet photo printer ever.
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S9000
Print up to A3+ sizes for
artwork, CAD and photographs.
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criteria. 3. Some features are not available on all machines. 4. S820D printer shown fitted with optional CV-100 LCD viewscreen sold separately. For more information please call Canon on 1800 021 167, or visit our website www.canon.com.au Specifications are subject to change without notice. Canon Australia Pty Ltd ABN 66 005 002 951.

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6 ink colours and 1/6 density photo inks achieve up to 49 tonal levels per pixel, for virtually continuous tone printing.

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You can...

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Snap and sound

"Wearable Card Camera" — that's what Casio is calling its new Exilim range of ultra-slim (11.3mm) digital cameras. The entry-level EX-S1 retails for \$579 and features 1.3 megapixels, built-in flash, 4x digital zoom, a 1.6in LCD monitor and 12MB of internal memory. The more expensive EX-M1 model (\$699) adds an MP3 player and sound recording capabilities. An SD card can also be slotted in for extra memory. <http://world.casio.com/pacific>



Alpha better

In what looks like a return to the electronic word processors of yesteryear, AlphaSmart has found a somewhat different style of application for the Palm OS. Simply called "Dana," this \$738 device is pitched as an alternative to a regular notebook. Dana features a full-size keyboard and runs Palm OS 4.1 displaying on a 560 x 160 resolution screen. A word processor called AlphaWord is included as well as QuickOffice. Its hardware boasts two SD card slots, two USB ports and infrared, though built-in memory is limited to just 8MB.

www.alphasmart.com



SMS for PC

Ever wish SMS was as easy to manage as email? Local company Call Direct has invented the ultimate PC-SMS machine. The Office SMS kit (\$699) consists of a cellular modem and customised software that composes and manages SMS like a regular email program. By plugging your PC into the mobile network, you can type out individual, group or "canned" SMSes and keep a log of everything you send and receive. The cellular modem needs its own SIM card, and call rates are the same as your regular mobile GSM charges. www.calldirect.com.au



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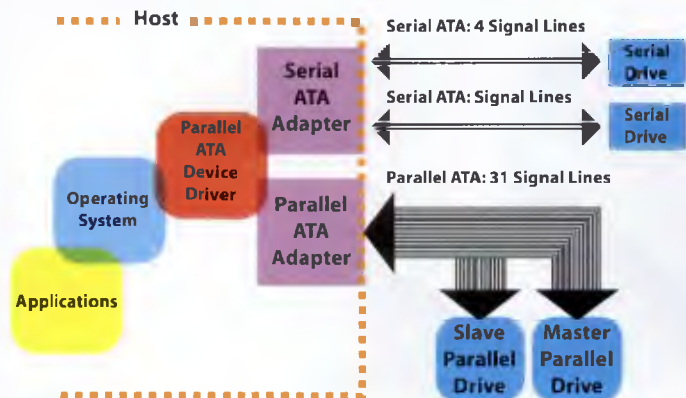
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JUNG SOFT

ATA Device Connectivity



► Serial ATA does away with master/slave arrangements.

Interfaces ATA glance

That spacious new hard drive could be hamstrung by a slow pipeline to your PC's innards. Ashley McKinnon examines the future promises of the ATA interface.

When buying a new hard drive you're presented with two main choices of interface: ATA-100, with its rating of a peak 100MB/s transfer speed, or the snappier ATA-133, with a 133MB/s throughput.

ATA-133 presents a 33% theoretical performance gain over ATA-100. We say theoretical as even under the strictest labs environment, you'd never hit a sustained 100MB/s or 133MB/s transfer rate. But do the bigger numbers make a difference? APC put two new ATA-100 and ATA-133 hard drives head-to-head with a rigorous series of benchmarking tests.

Our crash test dummies were a Western Digital Caviar WD800BB 80GB (ATA-100) and a Maxtor DiamondMax 6L080J4 80GB (ATA-133). Each unit was installed into an Athlon AMD XP 2000+ system with a MSI K7T266 Pro2-A motherboard and 512MB of RAM.

The first set of tests benchmarked file system performance under SiSoft Sandra Professional 2002, and the results were a little surprising.

The ATA-100 drive produced a file system score of 24,642 while the ATA-133 notched up a score of 27,156. Considering that the older and substantially slower ATA-66 interface is averaged at 17,000 and an ATA-33 drive at 8,000, the extra speed gained from an ATA-133 drive is very minor: only 9% performance edge over an ATA-100 hard drive, well short of the theoretical 33% boost.

ZDNet's WinBench 99 showed similar results, although the margin increased to around 12%.

This indicates that unless you need more storage than the maximum 137GB ceiling of an ATA-100 drive, the performance benefits of an ATA-133 interface are hard to realise.

The problem is that in its current form, the ATA interface technology is fast approaching its physical limits, both in terms of speed and size. It's already hard-pressed keeping up with the rest of the technology inside your PC.

Which is why a working group comprised of industry heavyweights including IBM, Intel, Dell, Maxtor and Seagate has developed the Serial ATA specification as the PC's next-generation hard disk interface.

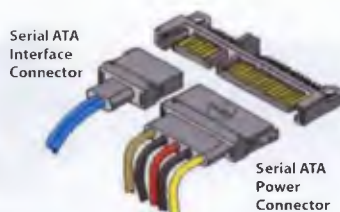
On the menu for Serial ATA is increased speed, starting at 150MB/s and throttling up to 600MB/s. Serial ATA also replaces the 40-pin flat ribbon data cable and its fiddly connectors with a much smaller 7-pin lead that allows for improved airflow around the drive and case.

This also lets each Serial ATA device have a direct attachment to the motherboard, doing away with today's master/slave scenarios. These are limited to two devices per controller interface and force both drives to share the same data cable.

In addition, the new direct connection allows for hot swapping of drives, something that's been available only in a quite limited and very expensive form under the current parallel ATA spec.

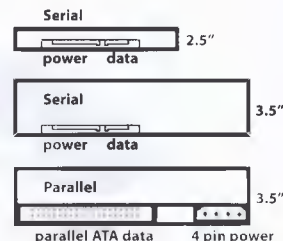
While the Serial ATA interface will pose no problem for existing disk software, what happens on the motherboard is a different matter. Motherboard and chipset vendors expect to start implementing Serial ATA technology into their products by 2003; existing boards will require an add-on card to work with the new interface. **FILE**

Appearance of Serial ATA Connectors



Drawing courtesy of Molex

Device Connector Sizes and Locations



► A detailed look at the new Serial ATA connectors.



There's one nearly empty. Do you throw them all away?

Many inkjet printers – even some quite expensive ones – combine several different ink colours into one cartridge. When one colour

runs out, you have to throw away the whole lot.



Most Canon models use inexpensive separate tanks for each colour. They also have an advanced ink monitoring system that



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alerts you on-screen when any of the colours are getting low – so no more running out of ink halfway through a document.

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us on 1800 021 167, or visit our website

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You can...

Canon

The contenders

In a world full of digital cameras, camcorders and PDF files, why are scanners still selling so well? It's because there's plenty of analogue legacy still out there — especially in the form of snapshots and 35mm negatives.

Ben Menge sizes up two flatbed models that deliver built-in film scanning at affordable prices.

apc

EDITOR'S
CHOICE
SEPT
2002

Canon CanoScan D1250U2F



Contact Canon Australia

Phone 1800 816 001

Online www.canon.com.au

Price \$349

Verdict ●●●●●

SETUP AND USE

Load the software, plug into a USB port and you're set. You should be able to do this in about 20 minutes. The scanner has four hardware buttons for instant scanning of photos and film, copying of documents and emailing pictures.

QUALITY

For a flatbed scanner in this price range clarity of image is superb. Photos are realistic in tone and brightness, without artificial vibrancy. Some may find the results a little subdued, but trueness to the original is important, as enhancements can be made with the bundled Adobe software. Slides and film scanned equally well and were just as easy to handle, thanks to the backlit transparency adaptor built into the lid.

PERFORMANCE

We tested the D1250U2F on both USB 2.0 and USB 1.1 (the same USB port uses both pipelines). Scanning speed is significantly faster under USB 2.0 — a postcard-sized photo took only a third of the time of USB 1.1 scanning at 600dpi. That's an especially important factor as you move up in image size and resolution.

AESTHETICS

Canon has recently updated the appearance of its entire peripherals range. All upper surfaces now come in a pin-striped translucent navy-blue plastic with a neat holographic logo around the middle. The buttons are large and smooth with concise labelling. The D1250U2F's profile is slim and its footprint won't eat up precious desktop real estate.

SOFTWARE

Canon's ScanGear Toolbox is a colourful set of buttons to simplify and accelerate your scanning experience. At the click of a mouse, button-scanned articles can be emailed, saved to disk, or sent to your printer. Photo management is a cinch with ArcSoft's Photobase. Albums and multimedia presentations are easily created on your hard drive as are sorting and printing functions.

The very capable Omnipage Pro 9.0 has long been the character recognition benchmark. As well as raw text, Omnipage does a fine job of rebuilding pages with graphics and tables embedded in them.

Canon CanoScan D1250U2F versus Hewlett Packard Scanjet 3570c

The verdict: Canon wins but HP not far behind

With identical pricing and very competitive offerings, you can't go wrong with either of these scanners. That said, the CanoScan D1250U2F wins this bout due to its slimmer size, fast USB 2.0 interface and excellent software bundle.

If you do have room for the bulkier HP and tend more towards

photo or document scanning rather than transparencies, the Scanjet 3570c's dual CCD head makes fast work of 300dpi scans. But with the Canon once more edging out the HP when it comes to working with higher resolution scans, and the addition of the Omnipage Pro OCR software, it's hard to go past the CanoScan D1250U2F.

Hewlett Packard Scanjet 3570c



Contact Hewlett Packard

Phone 13 13 47

Online www.hp.com.au

Price \$349

Verdict ●●●●○

SETUP AND USE

The designers in the Canon and HP camps obviously had the same idea: the fewer add-on pieces required to make a fully functional scanner, the better. The lid of the 3570c has a film and slide backlight built in. Just slip transparent media into the guides in the lid and scan with press of a button. If you have high numbers of 35mm negatives or slides, this is the best way of scanning at very high definition.

QUALITY

Image clarity is excellent, although with all settings at default values, the brightness and contrast seem a bit enhanced. This caused some disparity between the scanned image on screen and the original (this may not bother some users). Film scanned easily but the test images suffered a blue tinge all over. HP's Auto Adjust button within the Album and Print application brought the colours closer to normal.

PERFORMANCE

The USB 1.1 interface doesn't detract from its scanning performance of up to 300dpi (where it was 50% faster than the Canon). At higher resolutions however, it was obvious that bus speed dragged down the total scanning time.

AESTHETICS

It's not clear why HP's scanner is substantially longer, wider and thicker than the Canon, but it is going to make a big difference if you're already short of space. Otherwise, it's a very cool looking unit. The lid appears very iMac-esque, although you could say the whole thing resembles a tanning booth!

SOFTWARE

The HP Director button-box is similar to Canon's Toolbox. Photo scanning, archiving and albums are facilitated by HP's propriety software suite. The supplied image editing software is not as extensive as that of Canon's offering though — some basic image manipulation functions are included which are handy for making changes before saving to disc.

The Memories Disc is a semi-automated application designed to create slideshow CDs. Scan your images, select the destination CD-R/RW drive, add music from a variety of audio formats and burn to disc. The result is an automated HTML slideshow that will run in any browser.

The lack of Optical Character Recognition (OCR) software means limited text scan support. Text documents can be scanned, but are then dumped to Word and left for the operator to spell-check and format.



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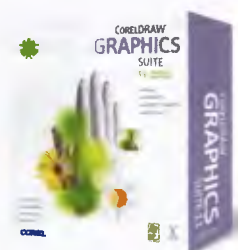
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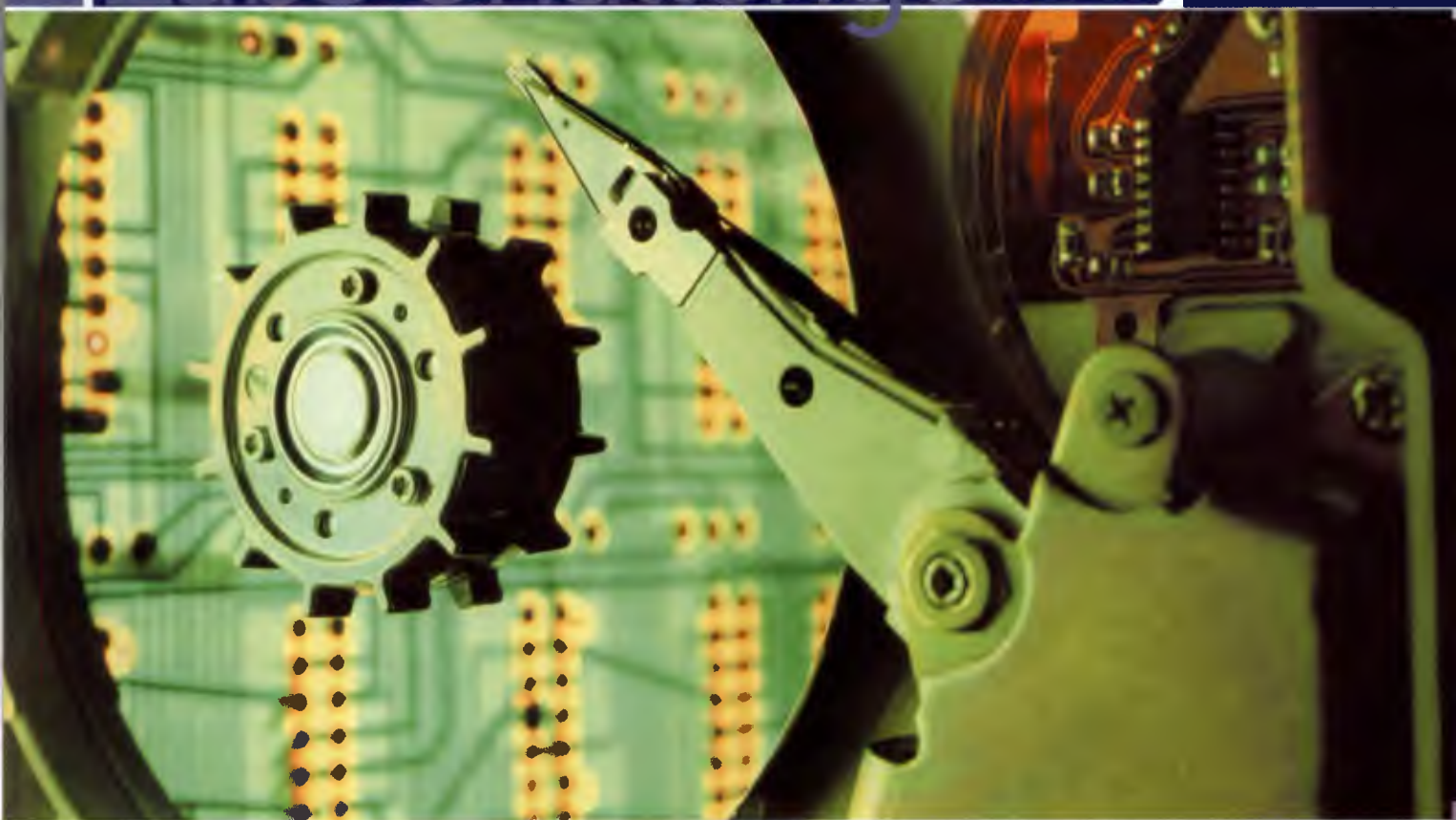
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Hard disk power guide

You want more storage space? Here's how to get it! We've reviewed 14 hard drives, plus we check out software to manage your fatter platter.

Anyone who's been into computers since the days of DOS can remember their first hard drive. Stepping up from a PC fitted with a single floppy drive (two, if you were a power user) to a hard disk was the stuff of Nirvana. By today's standards that disk was slow, noisy, expensive and laughably low in capacity. Yet in those shining days you wondered how you could ever fill that 10MB or 20MB magic box!

Every PC you've owned since then has boasted a larger hard drive that's generations ahead. And every few years you've realised it's still not large enough.

We don't need to tell you about the compromises of an outdated hard drive — the speed, the noise, the constant question of "Do I have enough room to load this program?" But we can tell you which are the best drives to step up to, as well as the ones to sidestep.

We've also rounded up six external drives with a mix of FireWire and USB 2.0 interfaces. These are ideal for adding capacity to your notebook or letting you move massive slabs of data (especially video files) between desktop PCs. And if you still can't find a drive among that lot to suit your needs, on page 76 we've shown how to easily assemble your own pocket-sized drive.

And to complete the picture we've assessed software to help you make the move to, and make the most of, your new drive.

60

Performance

The hottest 7,200rpm internal IDE drives from Maxtor, Samsung, Seagate and Western Digital.

66

Value

Wallet-friendly internal IDE drives from Maxtor, Samsung and Western Digital.

70

External

Super-safe backup, super-fast file transfers, super-portable data: six external hard drives that do it all.

78

Software

We put ten partitioning, imaging, and data migration utilities to the test.



Speed thrills

They're big, they're fast and they'll swallow every byte of data you throw at them. *Matt Overington* tests five high-performance hard drives.

Drives have long been the ultimate in performance ATA desktop hard disks. They represent the Holy Grail for gamers, performance junkies, and DV editors who need blazing-fast access speeds and transfer rates for bandwidth-intensive applications.

The first characteristic to look out for is a spindle speed of 7,200rpm. When a drive platter is spinning at 7,200rpm versus the 5,400rpm of a value-priced drive, it takes less time to move the read head to a given track. This is because the disk is being rotated further as the read head is moving across it. This allows faster alignment of the head to the platter, therefore faster access times. If data is being read sequentially from the drive, a 7,200rpm drive can read one-third more data than a 5,400rpm drive over any given time period.

The data transfer cache will fall between 2MB and 8MB but, if performance is key, our tests show that you should go for the biggest buffer you can find. A larger buffer will really make a difference if you are transferring a number of small files, or are reading and writing small packets of information to the drive, as is also the case with a lightweight database.

On the downside, 7,200rpm drives are more expensive than their sluggish brothers. And because the platter spins faster, they also can be more prone to vibration, noise and rotational damage.



Maxtor DiamondMax D740X-6L

It's called a Diamond, and it's sure priced like one, but in almost every respect it's closer to cut glass.

The 80GB D740X-6L is positioned as the jewel in the crown of Maxtor's performance range of hard disks. Unfortunately, it's not a very valuable jewel. Under ATA-133, this drive was left eating digital dust at the back of the pack, with an embarrassing WinBench 99 High-End Disk score of 20,700 WinMarks.

And if you're sticking with the ATA-100 interface, Western Digital's WD800AB has much more valid claims to your hard earned. Even though it's sold as a 5,400rpm "value" drive, the WD800AB pummeled the 7,200rpm D740X-6L with a High-End Disk score of 24,600 versus Maxtor's 20,100. Both have 80GB capacity, the WD costs \$185 and the Maxtor \$245. You do the math.

We noted a slight performance boost when running the ATA-133 interface, with the biggest difference being a doubling of the WinBench 99 Business Disk score from 6,270 to 11,900. This is by no means representative of the overall system performance improvements that you'll get from upgrading interfaces, but it does illustrate the ATA-133's effectiveness for short burst transfers.

The 40GB platters inside the D740X-6L are the largest currently employed by desktop drive manufacturers. By shoehorning data onto these platters the read head doesn't have to move as far to read the data from the drive. Well, that's the theory and it clearly doesn't work here.

At least Maxtor provide a three-year warranty, by which time you'll be more than ready for an upgrade anyway.



<< Details

Contact Maxtor Australia
Phone (02) 9369 3662
Online www.maxtor.com
Price \$245

Verdict

- ✓ Good performance for burst transfers.
- ✗ Performance is not up to ATA-100 drives unless you are running ATA-133.





Samsung SpinPoint SP8004H

A value-packed drive that hammers along without making a fuss — or a sound for that matter.

Samsung's SP8004H is a silent achiever. Literally. Although the 80GB drive attained only modest benchmark results — especially under cached operation — we were impressed by the drive's whisper-quiet operation.

The benchmark results put this 7,200rpm drive towards the middle of the pack in terms of speed, but when it comes to a performance/price scale, the SP8004H is right up amongst the leaders. The High-End Disk test, which assesses sustained transfer rates (for reading exceptionally large files) assayed the SP8004H at 26,300 WinMarks.

On the cached data read test from Michael's Disk Benchmark (MDB 95) this drive did rather well, moving data out of the 2MB cache at 42,288Kbit/s, which indicates a fast memory subsystem. But don't choose a disk on this alone. Unless you've got a buffer of at least 4MB you won't notice any improvement against a slower buffer of the same size. That's because Windows constantly moves data to and from the drive, so any advantage afforded by faster memory is quickly gobbled up by active applications.

We were very impressed with the drive's whisper quiet operation — the drive chassis itself is designed to absorb some of the clatter coming from the drive motor and the read arm assembly. Like the Seagate and Western Digital drives, the SP8004H's inclusion of SMART allows the drive to automatically monitor and repair any problems that develop on the fly.



<< Details

Contact Westan Australia
Phone (03) 9543 7733
Online www.westan.com.au
Price \$206.80

Verdict

✓ Very quiet operation.

✗ Very average performance.



Seagate Barracuda IV 80GB

Another quiet achiever, the Barracuda's motor rests in viscous fluid to reduce drive noise without hampering performance.

On the surface, the 80GB Barracuda IV is similar to the other contenders slotted into our "Performance" category, with its 2MB buffer and 7,200rpm spindle speed.

Under the High-End Disk test, the Barracuda IV scored 27,900 WinMarks, and 12,400 in the Business Disk test. These are good results, but when you consider that this drive lags behind the more affordable Western Digital WD800BB, this Barracuda loses some of its bite.

That was the recurring theme throughout all of our Labs tests: the Barracuda was consistently the most expensive drive in the 2MB cache category, even compared to faster drives. If you're after value for money, look elsewhere.

However, the Barracuda's use of a "fluid dynamic bearing motor" is very impressive. The moving parts of the drive are encased in an oil-like fluid to help reduce the heat, vibration and noise generated by friction.

This puts the Barracuda almost on par with the Samsung SP8004H in terms of audible output. The technology, which Seagate calls SoftSonic, also helped the drive remain still during long sequential reads and writes.

SMART is also built into the Barracuda; the bundled SeaTools suite of programs is on par with the utilities of other drive vendors, and is intended to monitor and repair disk faults.



<< Details

Contact Seagate Australia
Phone (02) 8748 2700
Online www.seagate.com
Price \$255

Verdict

✓ Quiet and smooth.

✗ Slow and expensive.



WHERE HAVE ALL THE VENDORS GONE?

Hard disk capacities keep growing but the number of players are shrinking, reckons Matt Overington.

Flipping through these pages, it's obvious that a lot of the big brands have disappeared from the hard drive landscape. Even assembling our own hit-list of vendors for this challenge led to a wave of "Whatever happened to ...?" reminiscing.

The manufacturing pool for desktop ATA drives has almost completely emptied in recent years. Many players either went under, were bought out by rivals or shifted their focus to components with a higher profit margin.

Connor fell into financial difficulties before being acquired by Seagate in 1996. Quantum's response to the woes of earning hard cash for hard disks was to split the company into one group for DLT and storage systems, and second for hard drives. The latter was snapped up by Maxtor in 2000.

Fujitsu pulled out of the desktop hard disk game late last year, preferring to focus on SCSI and notebook drives. A lack of growth in the desktop market was cited as the reason for the move. Between the 2000 and 2001 fiscal years, Fujitsu's unit sales dropped 28.5%, from 23.5 million to 17 million units.

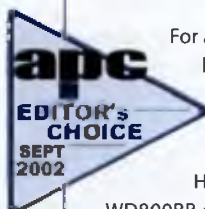
And IBM? Big Blue's strategy is to source drives from a number of manufacturers and sell them under the Deskstar banner. You can only order an IBM hard disk based on the drive's capacity, not on who built it. As a result your IBM drive could come from one of three hard disk makers.

When we approached IBM to submit drives for this roundup, the company declined on the basis that they had no guarantee of supplying that exact same model if a customer placed an order.



Western Digital Caviar WD800BB

Our Editor's Choice for this roundup impressed with solid performance at a great price.



For a high-speed and relatively low-cost 7,200rpm desktop hard disk, the Western Digital Caviar WD800BB is hard to overlook. On specs alone the WD800BB is nothing to write home about: it has an ATA-100 interface, 7,200rpm spindle speed 80GB capacity and 2MB buffer.

However, the benchmark scores tell a different story. The WD800BB consistently returned high data transfer speeds and came second only to its sister "Special Edition" WD drive, which enjoys the benefits of a whopping 8MB buffer.

The WD800BB has ample bandwidth to handle working with digital video or large database files, and despite the ATA-100 interface it soared past both of the ATA-133 drives on the test bench. This drive scored 30,600 WinMarks under the High-End Disk test and 12,700 under the Business Disk test.

Western Digital's secret weapon is a rotary voice coil actuator, which is slightly more efficient at inducting a charge into the voice coil compared to the flat actuators of other drives. This boosts the data transfer rate between the platter and the head. It also means that the read head is able to move on to the next data location whereas conventional heads would still be sucking up or spitting out the bytes.

The supplied Data Lifeguard software utility is SMART-aware, monitoring and repairing errors during idle times, so there's no impact on overall system performance.



<< Details

Contact Westan Australia
Online www.westan.com.au
Phone [03] 9543 7733
Price \$203.50

Verdict

✓ Clear winner in price/performance.

✗ Not the quietest drive around.





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BEYOND THE BIG DISK

We'll always want bigger hard drives. *Simon Tsang* reports on the technology under the next-gen platters.

Forget Star Wars. In the hard disk industry it's all about *Space Wars* or, to be more specific, how much data can be squeezed onto that space. The researchers call it "areal density" and measure it in gigabits per square inch (Gbit/in²). Hard drive manufacturers compare their respective areal density ratings against their rivals and also use the spec to map the progress of ever-increasing capacities in the same physical area.

Existing Giant Magneto-Resistive (GMR) head technology using Current-in-Plane (CIP) mode, which accounts for the majority of hard disks in the market today, will theoretically reach their areal density ceiling at around 100Gbit/in².

And it's the small, removable and 2.5in hard drives found in notebooks that are leading the technology charge. Like Formula 1 racing, these "bleeding edge" technologies developed for the mobile market are trickling down to its larger format cousins such as desktop 3.5in drives.

Fujitsu has just released its new 2.5in mobile MHS hard drive series that deliver a "best-in-class" areal density of 53.2Gbit/in². This allows for a 30GB capacity on a single 2.5in platter, which means the Fujitsu drive at 9.5mm in height accommodating two-platters is a capacious 60GB. Applying Moore's Law to this predicts that conventional CIP-GMR technology will hit its limit of around 120GB in 12 to 18 months.

Unless more platters are added (a measure that's not ideal for notebook drives), the only way to increase capacity is to increase the areal density. That's where Current-Perpendicular-to-Plane (CPP) mode heads come in. Fujitsu claims hard disk drives based on CPP-GMR technology will have recording densities of 300Gbit/in² and beyond. This equates to capacities from 160 to 360GB, and Fujitsu expects to make this commercial reality within two- to four-years.

Hitachi similarly has a "perpendicular magnetic recording" breakthrough for areal density, though expect the release timeframe to be around the same as Fujitsu's. Toshiba's release of a removable 1.8in hard drive in a standard Type II PC Card format also demonstrates how far storage technology has come, and how far it has yet to go. The card is already available in 10 and 20GB models.

Another arena driving hard disk development is consumer electronics such as digital video recorders and music players. High capacity, high-performance, low-cost and low-noise characteristics are in huge demand, and much of the cutting edge research and development will be dedicated to this space.



Western Digital Caviar WD1000JB

It's not just big-screen blockbusters that come in "Special Editions". An 8MB buffer puts extra grunt behind this Western Digital drive.

The WD1000JB is by far the fastest ATA drive we've ever seen in the APC Labs. A massive 8MB data transfer cache helped the WD1000JB cruise past every other drive on the bench in a canter, and by a significant margin. The 100GB capacity is a big bonus.

Under the Business Disk test, the WD1000JB shot up to 17,400, which was 37% faster than the second-quickest drive (another Western Digital). Gamers, database operators, and anyone working with raw DV footage will appreciate the performance edge, as well as the capacious 100GB spread across three platters.

Other tests didn't produce such a vast gulf in the scores, because Business Disk places a heavy load on the disk cache.

We had initial concerns that the physical specification of the drive itself would pull back on the speed boosts from the large disk cache, reducing the sustained transfer to the same pace as the 2MB-equipped WD800BB. Thankfully, the engineering behind the WD1000JB is optimised for the 8MB cache, giving the drive a clear lead in the High-End Disk tests (35,000 WinMarks) and random reads/writes (7,228/10,140 Kbit/s).

It's a shame that even at this premium price point, Western Digital couldn't do more to suppress the drive's omnipresent whirring noise. Benign in possession of the fastest drive in the neighbourhood is one thing — hearing it spinning along under your desk is something else.



<< Details

Contact Westan Australia
Phone (03) 9543 7733
Online www.westan.com.au
Price \$339.90

Verdict

✓ Fast, and 100GB capacity.

✗ Very expensive and still noisier than we'd like.



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- b) an application error?
- c) a power surge?

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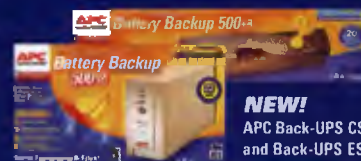
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Budget beaters

They're not the fastest drives you can get says Matt Overington, but the price (and sometime the capacity) is right.

Student machines, low-end business workstations and file storage repositories tend to have the same requirements of hard disks: they've got to be capacious and inexpensive. Breaking land speed records when moving files is less important than how many of those files can be stored in the first place.

Most desktop hard disks in the value range will have a 2MB SDRAM data transfer cache, but the biggest single indicator of a drive's performance is the spindle speed. A value drive's platters are rotated at 5,400rpm, while in a performance ATA drive they will spin at 7,200rpm.

This means that less data is physically passing under the read heads over any given time period, so the read times will be longer than for performance drives. Value drives are often not fast enough for editing DV, and high-end 3D games that put a heavy load on the hard disk will suffer from dropped frames.

As the motor physically rotates the platter more slowly in a 5,400rpm drive as opposed to a 7,200rpm model, they are quieter, emit less vibration, and cause less wear to moving parts.

This translates into a longer lifetime before failure. The warranty period on most new hard disks is around three years, so this is only needs to be considered if you anticipate that you will be using the drive beyond that period.



Maxtor DiamondMax D540X-4G

The D540X-4G scores low on the performance benchmark, but high on the dollar-per-megabyte scale.

Maxtor's D540X drive series demands that you carefully examine your needs. If you want speed, look elsewhere. If you want a hard disk so large that it needs its own postcode, then this could be the answer. You can enjoy 160GB of data on tap — provided your PC has an ATA-133 interface.

Like all other Maxtor drives, the DX540X family uses the ATA-133 interface, designed by the vendor itself to bridge the gap between the ATA-100 and new Serial ATA standards. In turn, ATA-133 supports another Maxtor initiative, the aptly named "Big Drives" venture.

By stacking together four 40GB platters, the D540X-4G is the first drive we've seen to surpass the ATA-133 spec's native limit of 137GB. The catch is that your PC must have an ATA-133 controller card, or the drive will be capped at 137GB.

Aside from the extra elbowroom, our benchmarks indicated a throughput boost of approximately 10% (scaling from a WinBench 99 Business Disk score of 8,520 WinMarks for ATA-100, to 9,910 WinMarks if the D540X is channeled through an ATA-133 interface card).

Even on ATA-133, writing or streaming AVI video in real-time will put too much strain on the disk — for that, you'd need a WinBench score above the 10,000 mark — but it's fast enough to serve MPEG video or MP3 files. This 5,400 revolutions per minute (rpm) drive has a 2MB data buffer and is supported by Maxtor's "No Quibble Service" policy, under which the company undertakes to replace faulty drives for a new unit within two working days.



<< Details

Contact Maxtor
Phone (021) 9369 3662
Online www.maxtor.com
Price \$525

Verdict

- ✓ Massive storage capacity.
- ✗ Requires ATA-133 to get the most from the massive storage capacity.





Samsung SpinPoint SV8004H

If you've got an eye on your budget, and don't ask too much from your PC, the Spinpoint SV8004H is a solid contender.

With a low 5,400rpm spindle speed and a 2MB data buffer, Samsung's SpinPoint SV8004H won't set any land speed records. However, the generous 80GB capacity makes it hard to argue with the price.

At \$184.80, this is a no-brainer if you want a dumping ground for less frequently accessed data or a new primary disk to upgrade a low-performance desktop.

There is a price to pay for this but forget about making this a scratch disk for digital video or even the heart of your games machine, as the data transfer rates fall well short of such high-bandwidth demands. It trailed the field in almost every test. Under Business Disk, one of the most fundamental measurements of a drive's real world performance, the SpinPoint returned an abysmal score of 5,830 WinMarks.

In an attempt to compensate for the slow rotational speed the 80GB is spread over two platters. This densely packs data on the drive so the head doesn't need to move far for each disk access.

The Samsung drive supports host automatic acoustic management (AAM), which helps reduce operating noise, in conjunction with Samsung's NoiseGuard acoustic noise suppression technology. This reduces noise created by the read-arm, and during tests proved highly effective in dampening that otherwise annoying clicking sound.



<< Details

Contact Westan Australia
Phone (03) 9543 7733
Online www.westan.com.au
Price \$185

Verdict

✓ Inexpensive storage space.

✗ Too slow for DV and hardcore gaming.



Western Digital Caviar WD800AB

Western Digital's value-priced entry to our hard disk challenge could go head-to-head with most faster-spin performance drives.

Not only did this show a clean pair of heels to all the 5,400rpm drives we tested, it had similar performance characteristics to many 7,200rpm models. Even with its modest 2MB data buffer, the drive is speedy enough for digital video editing and other high-bandwidth apps.

Clearly the fastest value drive with a Business Disk score of 11,500 WinMarks, the WD800AB also outclassed the 7,200rpm Samsung SP8004H and Maxtor D740X-6L drives when in ATA-100 mode. Even under the more demanding High-End Disk test, the WD800AB scored an admirable 24,600 WinMarks. During the test the WD800AB's read arm generated a degree of ambient noise that, while unlikely to be heard by gamers over the surround-sound roar of weapons fire, could be the digital equivalent to a mosquito buzz if you're in a quiet office.

The Western Digital drives incorporate a SMART (Self-Monitoring And Repairing Technology) utility called Data Lifeguard that monitors for and repairs basic disk errors without interrupting usage. All Data Lifeguard's operations are performed in the background, without any noticeable impact on drive performance. The maximum capacity for the WD range is 120GB, which at 40GB per platter means that this range of drives are closing on the maximum addressable limit of 137GB under the ATA-100 specification.



<< Details

Contact Westan Australia
Phone (03) 9543 7733
Online www.westan.com.au
Price \$200

Verdict

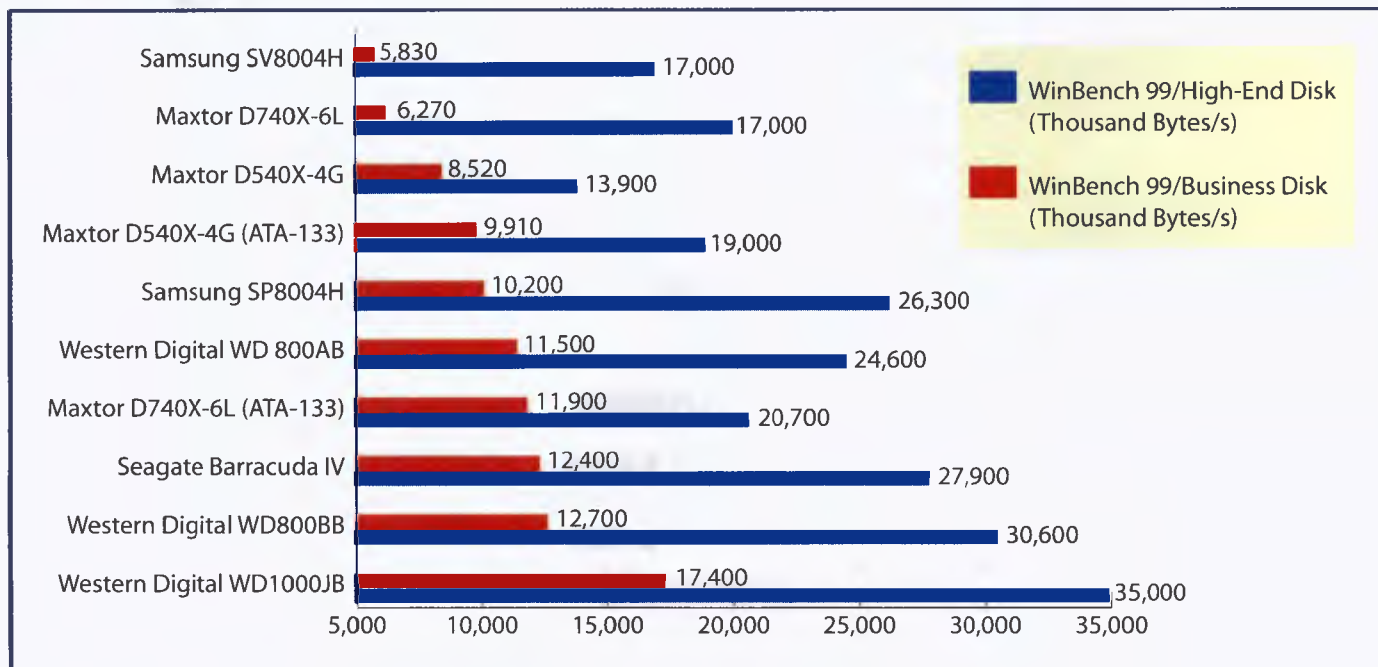
✓ Extremely fast for a 5,400rpm drive.

✗ Somewhat noisy.



Results

WinBench 99



How we tested Internal hard drives

Our test bed machine was an AMD Athlon XP1800+ desktop, based on the VIA KT266A chipset with 256MB of DDR SDRAM. We used a Promise ATA-100 controller with an 80-conductor cable for all the disk tests, and retested Maxtor's ATA-133 drives using a Maxtor ATA-133 controller card and Promise chipset. A bare installation of Windows XP with current ATA drivers was used as platform for the benchmarks.

Windows XP was installed onto a separate 30GB hard disk, and each drive under test installed as the master drive on the secondary IDE channel. Prior to each test the disk was formatted as a single NTFS partition, with an image of the boot hard disk taken (using Norton Ghost) and then restored before each benchmark was conducted. This ensured that each drive would always be tested under identical conditions in order to minimise the impact of system overheads.

Each test was run three times, and the scores averaged to give a result.

ZIFF-DAVIS BENCHMARKS

The WinBench 99 v2.0 benchmarks from Ziff-Davis provide an indication of performance by monitoring hard disk activity that simulates the real world results. The WinBench 99 High-End Disk test measures hard disk throughput (in KB/s) when reading and writing long sequences of data to the drive.

This is an indicator of how the drive will perform when playing games or writing digital video to the disk.

The WinBench 99 Business Disk test measures the transfer rate when performing short reads and writes to the disk at random locations, to give an idea of speed under productivity applications.

MDB 95

Michael's Disk Benchmark (MDB 95) is a synthetic benchmark that measures the disk performance for cached reads and writes. It can be set to write a file of a certain size to the disk and measure how long the process takes.

We opted to test with a 512MB data set because we didn't want the machine's 256MB of RAM to interfere with the results. It's important to use more than the system's available RAM in such tests to ensure that the memory subsystem doesn't affect the outcome of the tests.

Writes can be sequential, or use random sectors on the disk to test both seek and transfer times. The output of the results is measured in KB/s, and provides information on bandwidth for specific drive tasks.

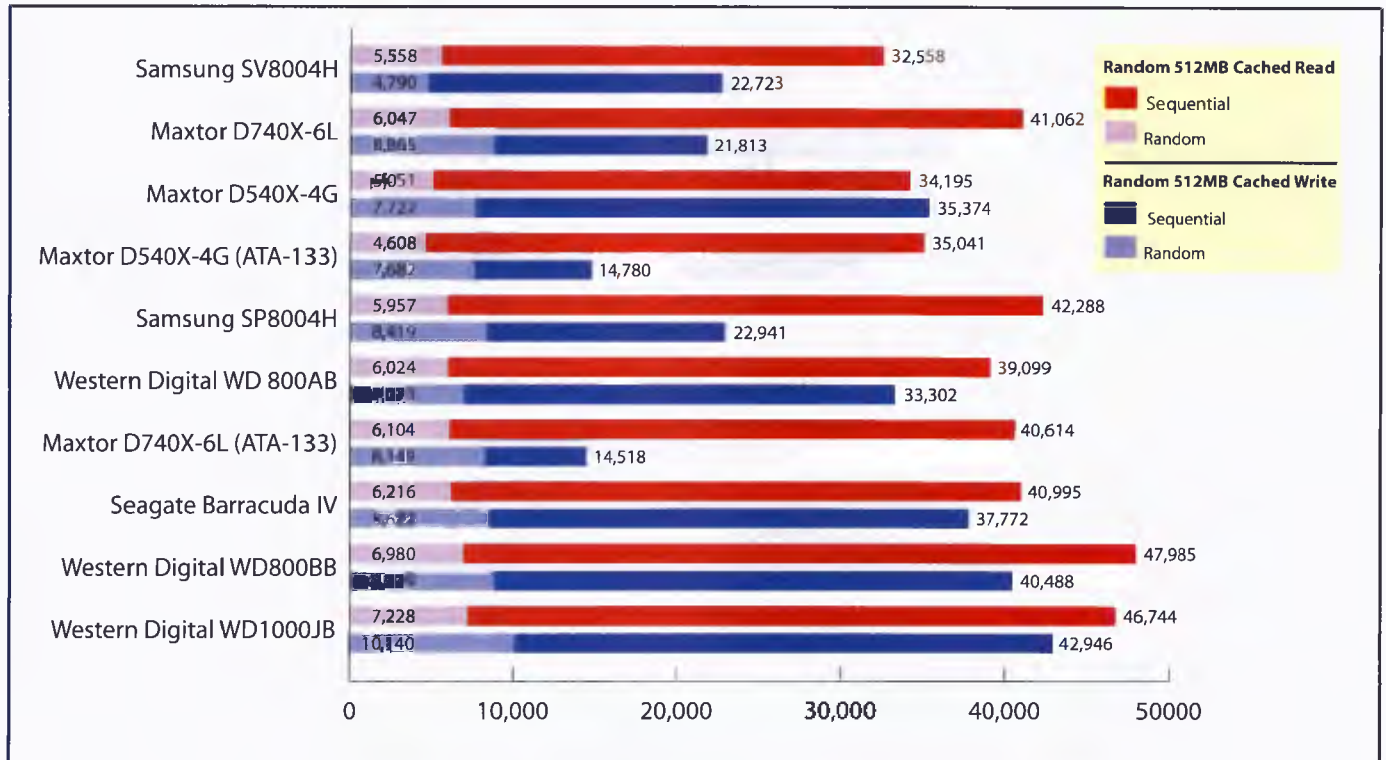
DRIVE! FOR NT

Drive! for NT provides a single hard disk score based on the results of three synthetic disk tests. Linear read speed, average access time and maximum cached read speed are all measured and rolled into a single number.

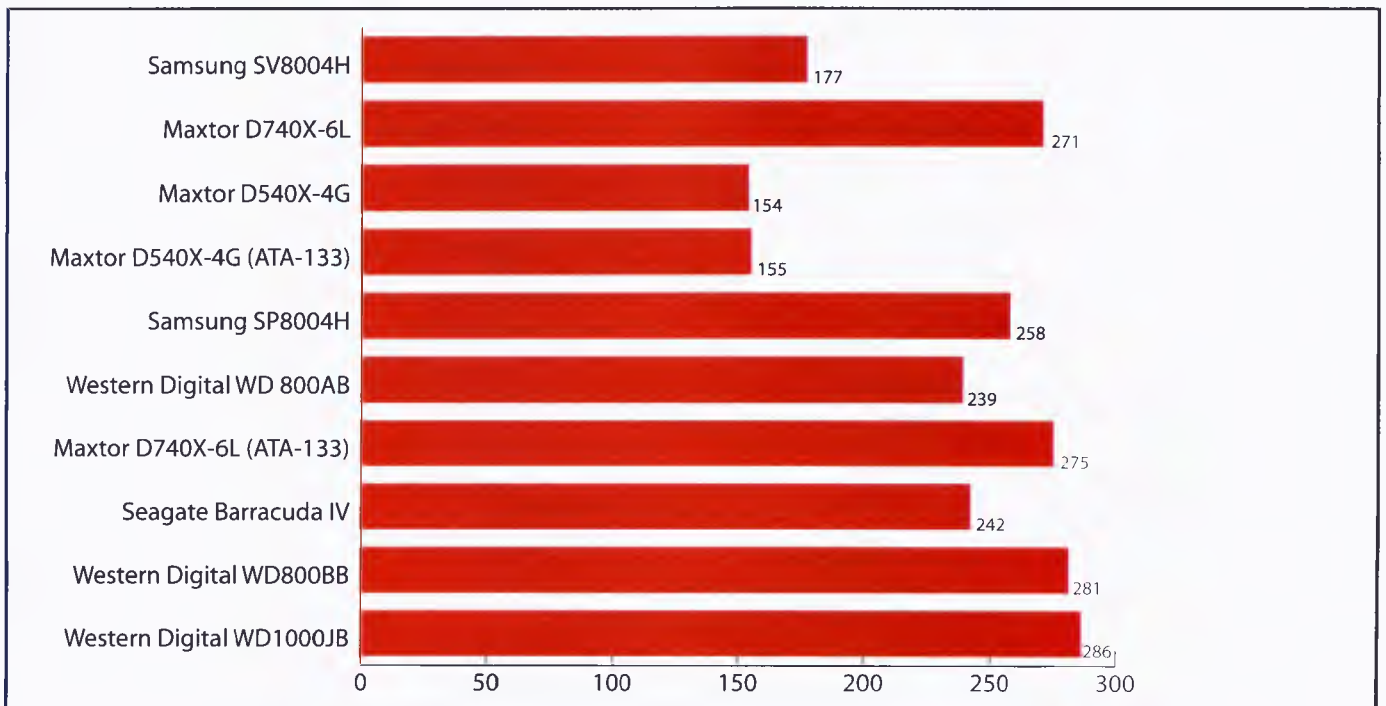
The first test gives an idea of performance when writing long strings of data to the disk, and is measured at both the start and end of the drive. This complements the access time test that measures the time taken to move the read head to any given location on the disk platters and the speed test for the cache.

Cached transfers only become important if the hard disk is sending small units of information to the controller at a time.

MDB 95 (Michael's Disk Benchmark)



Drive! For NT



Think outside the box

Super-safe backup, super-fast file transfers, super-portable data ... Ashley McKinnon tests six external hard drives that do it all.

Hard drives used to live like hermits inside the cave of your PC: safely locked away from the outside world. Fine if you want to ponder life, not so good if you want to share it with someone else.

External hard drives set your data free to roam. They're ideal for backing up the most essential files from your PC's capacious internal drive, as well as moving large files (especially video clips and massive MP3 collections).

We've rounded up six drives with a mix of attributes. Their physical size and weight is most important if you intend on regularly transporting your data between PCs. The disks range from notebook-class 2.5in platters to conventional desktop 3.5in drives, featuring varying speeds and capacities. We found that a fast IDE drive doesn't always guarantee a fast external drive unit, so check our test results if speed is your goal.

This also applies to the choice of interface. As a rule, FireWire outpaces USB 2.0, despite the later spec promising a 480Mbit/s throughput against FireWire's 400Mbit/s threshold. Only one drive in this batch lived up to that claim.

What's not in dispute is that the standard USB 1.1 interface, while perfect for low-bandwidth devices from mice to scanners, is totally the wrong choice for any external drive. So don't be duped — check that spec!

How we tested

Our test system for this feature was an Athlon XP 2000+ desktop with 512MB of RAM and an 80GB Maxtor 6L080J4 hard drive.

For connectivity we used an ST-Lab FireWire card and an Adaptec USB 2.0 Connect card.

Benchmarking was conducted with the File System Benchmark (FSB) component of SiSoftware's Sandra Professional 2002.

FSB copies 512MB of data

to and from the target drive, and measures performance against baseline scores where an ATA-33 drive is rated at 8,000, an ATA-66 drive at 17,000 and an ATA-100 drive at 24,000.

This allows the speed of external drives to be compared to internal drives. Our real world file transfer tests involved timing the copy of a 3.8GB folder from the PC to the external drive.



ABSplus USB 2.0

While this natty drive impressed with fast USB 2.0 performance, it's a shame about the miserly 10GB disk inside.

While this is the smallest drive in this roundup, the sleekly-designed ABSplus USB 2.0 feels quite solid for its handy size. And it's hard to fault in operation, although at \$650 you're paying a hefty premium for only 10GB of storage space.

Spinning quietly inside the ABSplus USB 2.0 at 4,200rpm is an IBM Travelstar 10GB hard drive. Like most, but not all, external drives the ABSplus is powered directly from the PC.

If you're connecting the drive via a USB hub, which is unable to supply enough juice to spin a 3.5in hard disk (2.5in drives are usually okay), you'll welcome the inclusion of a power cable that connects to your PC's PS2 port. The cable includes a splitter so you can also run a keyboard or mouse in parallel.

The ABSplus also comes in a FireWire variant carrying a slightly higher (\$700) price tag and a meatier 20GB drive. Surprisingly, it returned a benchmark score of 8,352 — slower than the USB 2.0 version's 8,621. These speeds were borne out by the 3.8GB file transfer test, where at 14 minutes and 27 seconds the USB 2.0 drive pipped the 15 minutes and 11 second result from the FireWire model.

It's worth noting that this was the first and only time this Labs Challenge saw a USB 2.0 device outperform a FireWire device.

The plug-and-play simplicity of both drive models extends to the bundled backup software, which continually scans the system for any data changes and automatically updates the backup file set.

<< Details

Capacity 10GB
Connectivity USB 2.0
External power PS2 port power cable
Software included ABSplus Backup
Contact Elantra
Phone (02) 9328 5808
Online www.cmsproducts.com
Price \$650

Verdict

✓ Very fast for a USB 2.0 device, quiet operation.

✗ Limited 10GB storage on USB 2.0 model.





Clearlight FireWire/USB 1.1 Combo

This compact and well-designed drive turned out to be a disappointingly lackluster performer.

Marketed as a hard drive enclosure, the Clearlight Combo can accept any 2.5in hard drive. The unit supplied for testing was fitted with a 5,400rpm IBM Travelstar 60GB hard disk. The drive is very small and light, and is fitted with a single USB 1.1 port plus a pair of FireWire ports in 6- and 4-pin configurations. It's whisper-quiet, and a flashing blue LED indicator the only clue that it's working.

The rear faceplate comes out with the quick removal of two screws, enabling the hard drive and interface board to slide out, which should make future upgrades a snap. Two rubber sliders hold the hard drive in position and cushion the unit against knocks and shocks in transit — a fact of life for any external (or at least transportable) drive. That said, we found that even a relatively minor bump can bring a 2.5in disk to grief.

Speaking of grief, the Clearlight Combo didn't bring much joy on the FSB benchmark tests either; in FireWire mode it struggled to reach a low 11,990.

The woeful USB 1.1 score of 2,186, with a copy time of almost 80 minutes for our 3.8GB file set, is less about the drive than the interface — USB 1.1 simply lacks the throughput for serious hard disk usage. As a result the Clearlight Combo ultimately stands, and fails, on its FireWire performance.

<< Details

Capacity 60GB
Connectivity 1 x USB 2.0, 2 x FireWire (6- and 4-pin)
External power Yes
Software Included Nil
Contact Silicon Memory Technologies
Phone (02) 9417 7822
Online www.macpower.com.tw
Price \$469

Verdict

- ✓ Stylish and well considered design, dual USB 1.1 and FireWire ports.
- ✗ S-l-o-w.



iceCUBE

A 60GB dual-interface drive with cool looks and hot performance in a heavyweight package.

If you're into flashy looks then you'll love the iceCUBE. Packing a 3.5in IBM Deskstar 60GB disk — rated at 7,200rpm — into an arctic-cool enclosure with dual USB 2.0 and FireWire connectivity, this is a well-rounded solution to your storage woes.

The drive is rather heavy for its size — although the outer casing is clear plastic, the weight of the metal surround encasing makes it inconvenient to lug around.

And as with Iomega's HDD External, the iceCUBE can't be host-powered so you'll need to take the power adaptor along for the ride.

The iceCUBE is the only drive we saw with two FireWire connectors, letting it be used as a pass-through device when daisy chaining to other FireWire devices.

Performance sits comfortably at the higher end of the scale, with FSB benchmark scores of 16,178 and a 3.8GB transfer time of 11 minutes and 23 seconds under FireWire; for USB 2.0, it was also a respectable 7,796, and 18 minutes to shift our test fileset.

The overall design is clearly inspired by Apple's iMac and PowerMac machines — all very stylish and hip — and this extends to a blue LED that throbs as the drive is accessed.

Unfortunately, not a single piece of software is provided, so you'll have to make do with your own choice of utilities or settle for the simple drag and drop method.

<< Details

Capacity 60GB
Connectivity 1 x USB 2.0, 2 x FireWire
External power Yes
Software Included Nil
Contact Silicon Memory Technologies
Phone (02) 9417 7822
Online www.macpower.com.tw
Price \$469

Verdict

- ✓ Stylish looks, decent performance, dual USB 2.0 and FireWire connectivity.
- ✗ Quite heavy, no bundled software.





iomega HDD Portable

The portable storage champs roll out a solid product with flexible interface options.

iomega has been in the storage business for a long time — long before the Zip drive made backup sexy, the company was churning out Bernoulli tape units — and its experience shows with the 20GB iomega HDD Portable.

Throughput was above average for a USB 2.0 device, with a very respectable benchmark score of 7,909 landing it a whisker behind the ABSplus. The 3.8GB data transfer test took an equally impressive 17 minutes and 43 seconds.

The HDD Portable comprises of two separate modules, showing some heritage from iomega's now-defunct Peerless drive system. The drive module contains an iomega-rolled 20GB platter (a beefier 30GB version is due for local release in September) and is whisper-quiet in operation. This snaps onto an interface dock sporting a USB 2.0 plug; an optional FireWire dock (also expected this month, although price unavailable when we went to press) provides the versatility of being able to use either interface.

It's an appealing arrangement for a drive as compellingly portable as this, although the need to cart around an AC power adaptor somewhat dampens things. The adaptor is barely the size of a cigarette packet, but the HDD Portable would be a truly portable grab-and-go solution if it could be host-powered through a PC's USB or FireWire sockets.

iomega bundles a full version of the company's QuikSync backup software, which writes files to the drive as they change.

<< Details

Capacity 20GB
Connectivity USB 2.0
External power Yes
Software Included iomega QuikSync
Contact iomega
Phone (02) 9925 7799
Online www.iomega.com
Price \$549

Verdict

✓ Compact and sleek design, very quiet in operation.

✗ External power source required.



LaCie FireWire Hard Drive

The LaCie is first past the post as this great value drive positively gallops along in the portable storage stakes.

When you first cradle LaCie's FireWire Hard Drive in your hands, you can't help but feel that you're getting plenty for your money.

It's not just the massive 80GB, 7,200rpm drive, which is the most generous platter in this Labs Challenge. It's not only the sizzling performance, which beat the rest with a benchmark score of 21,198 and a file transfer time of 8 minutes and 36 seconds for our 3.8GB files.

No, beyond those points, the sheer bulk of this drive adds to the perception of value. It's deceiving because when you look inside there's ample room to prove that the enclosure doesn't need to be this huge. It's a handicap for portability, but for the disk size and speed the compromise is one we could live with.

The extras add up, too. The two FireWire ports are ideal for daisy-chaining, and the bundled Silverlining software is simple yet effective for formatting and partitioning the drive (it's something you'll definitely need, as the drive comes unformatted).

We also had a chance to examine LaCie's sister USB 2.0 unit, which partners an identical casing with a larger 120GB hard drive and a USB 2.0 interface.

That one clocked an average score of 7,509 under the FSB benchmark and 19 minutes and 55 seconds for the 3.8GB file transfer.

<< Details

Capacity 80GB
Connectivity 2 x FireWire ports
External power Yes
Software Included Silverlining backup
Contact LaCie
Phone (02) 9669 6900
Online www.lacie.com.au
Price \$472

Verdict

✓ Very fast data transfers, affordable for its storage size.

✗ Not portable, needs an external power source.





DVPics™ Plus

A complete kit for making great movies on DVD, it includes the MGI VideoWave® editing software and the Sonic MyDVD® DVD creation software. Transform and burn your videoclips onto CDs or DVDs. Simply a great way to lock-in your special moments.

FireConnect for Notebooks

Take high performance FireWire connectivity wherever you go with this 3-port Cardbus. Kit also includes a Digital Video Software for you to quickly create and share your movies.



FireConnect 4300

A 3-port OHCI-compliant FireWire® /1394 host adapter for PC and Macintosh® systems that provides plug-and-play connectivity for FireWire devices such as hard drives, CD-RWs, scanners and camcorders. Also in the kit is the MGI VideoWave 4 SE software for Windows® systems.



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Xhub4+

Easy-access USB ports, stackable expandability, integrated cable management - even a place to put your favourite photo! This 4-port USB2.0 hub cleans up your desk and gives you access to the hottest new USB devices! It is also USB1.1 backward compatible.



Xhub4

With 4 easy access ports that support the high speeds of USB2.0 as well as USB1.1, it gives you connectivity to the latest accessories without sacrificing compatibility with your older USB devices. It looks great on your desk too!



USB 2.0 Upgrade Kit

Provides everything you need to get started with Hi-Speed USB: a 2-port USB 2.0 card, a 4-port USB 2.0 hub, drivers and USB Control Utility.



USB2connect 3100LP

This high speed 4-port USB2.0 card allows both your MAC or PC to work with both USB1.1 and USB2.0 devices. USB2.0 is the fastest USB standard ever supporting data speeds up to 480Mbps... 40 times faster than USB1.1



USB2connect 5100

Ultra-flexible 6-port USB2.0 card gets you connected with today's most popular peripherals and tomorrow's exciting new ones. USB2connect is easy to use. Simply install the card and its drivers and you are ready to go. It's for both USB1.1 and USB2.0 devices too.



USB2connect for Notebooks

This high-speed 2-port USB2.0 cardbus Adapter allows USB connectivity wherever you go. Without the need for an additional power brick to add weight to your bags, it gives you "performance on the run".



DuoConnect

The ultimate in total connectivity. With both FireWire and USB2.0 connections on a single card, you can save both money and a PCI slot. Plus you don't have to turn on your computer twice! Also included in the box is the Sonic MyDVD 3 software and the FireWire cable.



XHub7+

With 7 ports that supports USB1.1 and USB2.0 devices. This is the all-in-one solution for USB connectivity. XHub7+ can be stacked with any other Xhub including the XHub4 Series. Of course it includes a stand that helps manages your cables.

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Maxtor Personal Storage 3000LE

Big on size but not on performance, Maxtor's USB 2.0 drive falls well short of the mark.

If you value space more than speed, this self-proclaimed "personal storage" solution from Maxtor will be hard to pass by. The 120GB platter is Maxtor's own D540X-4G, rated at 5,400rpm, running through an ATA-133 controller and a USB 2.0 pipeline.

You'd expect this to be a sizzling package, but our tests returned a quite disappointing benchmark score of 7,602, and a positively laggard transfer time of just over 26 minutes for 3.8GB. If you can wait that long, a whopping 120GB of data awaits you. The drive is large but well-constructed, with a robust build quality which should afford some protection against knocks and bumps.

Plastic guides on the underside of the case allow for multiple 3000LEs to be securely stacked together, assuming you have plenty of both data and dollars. Curiously, there's no power switch on the 3000LE: plug it into your PC's USB 2.0 drive, or hook up the supplied AC adaptor to a powerpoint, and you're ready.

The MAXtools software included with the drive is a very limited utility to control power saving on the device. You can enable or disable the disk spin-down settings after 30 minutes, or choose to have it spin down immediately once data access is finished.

<< Details

Capacity 120GB
Connectivity USB 2.0
External power Yes
Software Included Maxtor MAXtools
Contact Maxtor
Phone (02) 9369 3662
Online www.maxtor.com
Price \$720

Verdict

✓ 120GB capacity, robust build.

✗ Average performance at a high price.



HARD DRIVES TO GO

Even the most compact of these external hard drives might not be portable enough to join your notebook on a road trip. And replacing your laptop's internal drive is a definite no-go zone for any but the most hard-core.

That doesn't mean you have to make do with your current laptop's drive until you trade up to a new machine. We've rounded up three mobile-friendly hard disks worth considering. As always in mobile computing, there are trade-offs: with these drives it's a much slower speed, lower capacity and higher price than their desktop siblings.

IBM's Microdrive packs a miniature hard drive into a CompactFlash Type II card. A supplied PC Card adaptor lets you slip the Microdrive into your notebook; you can also drop the drive directly into any handheld with a CF Type II slot. Expect to pay \$449 for the 340MB model, and \$699 for the 1GB version.

www.ibm.com.au



Toshiba side-steps the CF format and sticks with the PC Card standard as the housing for its slim 2GB hard disk (\$549). It's a great piece of kit, especially for drag-and-drop backups, although as with any such drive you'll want to keep an eye on increased battery consumption if you use it on a regular basis.

www.toshiba.com.au



The ABSplus-10, from CMS, allies a pocket-sized external 10GB hard disk with a PC Card connector to provide the notebook-to-drive interface. This allows the unit to employ a common 2.5in notebook drive, which gives it an edge over more miniaturised solutions for capacity, performance and price (\$650).

www.cmsproducts.com

Ashley McKinnon



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PROVEN SOLUTIONS FOR STORAGE MANAGEMENT

The D-I-Y drive

Can't find an external hard drive to match your specific needs?

Matt Overington tells you how to build your own.

You don't need huge pockets to afford a portable hard drive. You don't even need a notebook — the ability to take gigabytes of storage on the road makes external drives one of the coolest additions to your desktop PC kit. You can move even the meatiest files between work and home, or from a broadband machine to one still locked onto a 56Kbit/s landline.

Best of all, if one of the models in our roundup doesn't suit your requirements, it's surprisingly easy and affordable to craft a custom-made drive. All you need is an enclosure that holds the drive and provides the interface of your choice, and a hard drive to slip inside it.

While some drive enclosures house a 3.5in desktop hard disk, they tend to be too bulky and fragile for frequent transportation. Notebook drives are far better suited to life on the road. Their 2.5in footprint lets you get by with a smaller and lighter enclosure, yet they're more resilient to sudden impacts that could kill a desktop drive. As a bonus, you can often power the drive directly from the host PC's FireWire port, so there's no need to cart around an AC adaptor.

STEP 1: SELECTION

Choose your interface: FireWire for speed, but USB 2.0 for compatibility with older USB 1.1 systems. As a rule, FireWire enclosures cost around \$50 more than their USB 2.0 brethren. If you still can't decide, you can always lash out on a dual-mode enclosure with connections for both. Then choose your hard drive: pick any 2.5in notebook drive that matches your capacity requirements or your budget. If you're short on cash, or have modest mobile storage needs, consider a second-hand notebook drive.



STEP 2: CONSTRUCTION

There's no shortage of enclosures on the market, so shop around. Look for solid build quality, both in the housing and the drive mount. Also look for a good interface fitting — this in particular will get a solid workout and you don't want it to snap off when you need it the most. For this exercise we chose a bare-bones USB 2.0 module from Anyware Computers (www.anyware.com.au) which set us back \$93.50. Most external enclosures are screwless, so installing a drive couldn't be simpler: pop the cover off, connect up the drive to the interface and power cables, and drop your hard disk into the slot. Replace the cover, and you're hot to trot.

STEP 3: CONNECTION

When you hook the drive to your computer, wherever possible use the PC's own port and not a hub. Some hubs can't serve enough power to run the drive; and even if they do, you'll end up sharing valuable bandwidth with every other device on the hub. If you're especially concerned about the power issue, look for an enclosure that comes with piggy-back connectors to draw current from the PS/2 port. And to avoid damaging your motherboard remember that because PS/2 isn't plug-and-play, you should shut down the PC before plugging in the drive.



STEP 4: INSTALLATION

If you've got a plug-and-play OS, the external hard disk controller should be detected automatically as soon as it's connected. If the disk is brand new you'll be prompted to initialise and format the disk. In just a few minutes more you'll have gigs of space at your fingertips!



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Hard Copy

It's time to upgrade your hard drive, but what is the best way to transfer your data? Ashley McKinnon gives us the lowdown on the best software for the job.

For most of us, upgrading to a new and larger hard drive is inevitable, especially as prices drop. But there's much more to it than just mounting the drive inside the computer case — this is why most people put it off until it becomes absolutely necessary. Some still consider partitioning, formatting and software installation as a job best left to the professionals.

The real fun begins when you have to start loading software onto the new drive. You begin with the operating system, the applications and finally your personal data. Given the size of most of today's applications and software, this process could take quite a few hours. Luckily, there are alternatives to this drawn out process, and we have put many of these on test to point you towards the solution best suited to your needs.

Partitioning is the process of readying a hard drive to accept data, and is the first process in setting up a new hard drive. It defines the way data is stored, and is operating system-specific. All operating systems include their own utilities to partition hard drives, but there are several utilities that go beyond the scope of the standard FDISK type tool and make the process a lot easier. Some of the utilities even include boot managers, which define several partitions, each one able to hold a different operating system.

For those who already have a hard drive with all their data just the way they want it, we evaluate several tools for transferring that information between two drives. These utilities fall into two categories: imaging and migration. Imaging involves making a single file duplicate of a hard drive or partition with the ability to restore the image file onto another drive or partition. Migration differs in that it is the process of an exact copy, where data is directly transferred from source to target hard drive.

And we've also looked at two utility suites designed to manage every aspect of your hard drive.

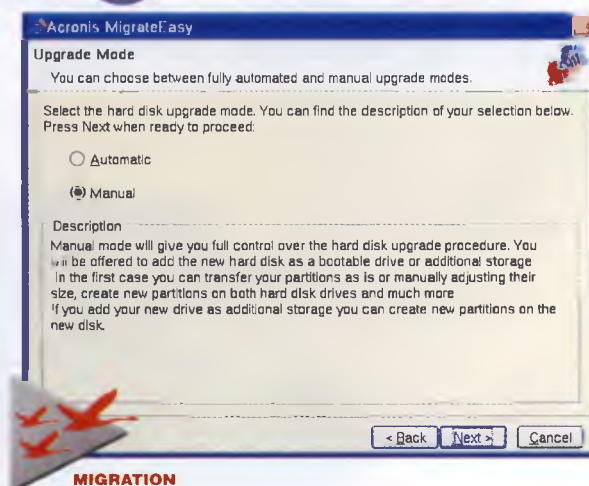
How we tested

To test all the software featured in this Labs challenge, a newly built system with an Athlon XP 2000+ processor, 512MB of RAM and two Maxtor 6L080J4 80GB hard drives was used. Each software package was loaded individually, and tested under both Windows Me and Windows XP Professional.

Where applicable, updates were downloaded to bring all

software up to the latest available version.

Partitioning software was tested using both FAT and NTFS file systems. Each image and migration utility was run twice to ensure a fair test. Optimisation software was tested on identical hard drives configured to 9% defragmentation levels, thus ensuring a fair comparison.



Acronis Migrate Easy Deluxe

Although Migrate Easy is a no-nonsense migration utility with some handy features, it doesn't exactly impress either.

Acronis offers Migrate Easy Deluxe, designed to transfer everything from one drive to another thus negating the need to manually reinstall the operating system and applications. This utility takes care of the migration data between two drives and can also be considered a duplicating application.

Once you have your new hard drive installed, running Acronis Migrate Easy Deluxe allows you migrate data quickly. Unfortunately, this program is an all or nothing affair. As the whole lot is migrated you cannot select specific files or folders to be transferred. Another downside is that Migrate Easy is run from a command prompt, so a boot disk will need to be created. You also have the option of auto loading from the Migrate Easy Deluxe CD.

Two different modes of operation are available: automatic and manual. Automatic mode has the user answering simple wizard questions and the migration process begins. Migrate Easy Deluxe also interrogates the partition information of the source drive and replicates it on the target (new) drive. Unfortunately, under automatic mode, Migrate Easy tags the new hard drive as the boot drive, so rebooting off the old hard drive is no longer an option, unless you know your way around Microsoft's FDISK utility.

Manual mode gives you a bit more control, and you can select your own partition sizes and control whether the new drive is bootable or not.

Just about any operating system is supported, but it would be a nice option to be able to choose exactly what data you want to migrate, not just everything.



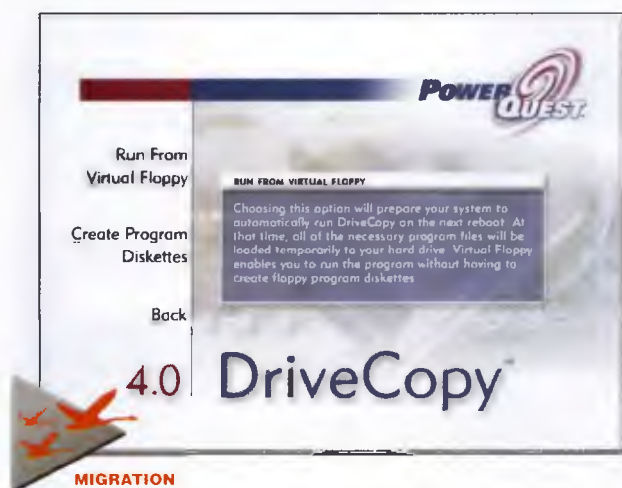
<< Details

Contact G & V Advance Electronics
Phone (02) 9666 7011
Online www.acronis.com
Price \$71.99

Verdict

- ✓ Quickly and simply transfers data between drives.
- ✗ Automatic mode may frustrate some users.





PowerQuest

DriveCopy 4.0

PowerQuest has delivered a simple and effective migration package with DriveCopy 4.0.

DriveCopy 4.0 copies the entire contents of one hard drive to another. Most people wouldn't consider this a complicated task, but simply copying files and folders across only does half the job.

Inexperienced users may be a little apprehensive using DriveCopy as it runs from a DOS prompt. This is necessary, however, as Windows will not let certain system files be copied while Windows is running. You have the option to either create a set of two floppy disks, or use a "virtual floppy" option, which sets up a directory to boot from to initiate the copy process. Restarting the system with either option loads straight into the DriveCopy program. The interface is clever in that it replicates a typical Windows interface, with simple point and click operation.

Excellent documentation complements the package and helps the novice to enable two hard drives to talk to each other. Details on most manufacturers' common settings are included, and for those needing more information, links to jumper-setting-specific Web sites are included. Under testing, DriveCopy certainly made good on its claims. After transferring the entire contents of one hard drive to another, the integrity was tested. The copied OS worked well, with all email settings, Internet information and personal settings being duplicated intact. For those worried about reinstalling all their software onto a new hard drive, DriveCopy provides a simple and effective alternative, saving both time and effort.



<< Details

Contact PowerQuest
Phone (02) 9521 6466
Online www.powerquest.com
Price \$99.95

Verdict

✓ Very detailed documentation.

✗ Has to be run from a DOS command prompt.



THE HARD INFO

Image software, such as Norton Ghost 2002 and Acronis True Image, work by first interrogating the hard drive to determine partition structure, file system used and size of data stored.

On a hard drive with multiple partitions, each one is interrogated individually and a summary is presented to the user. Because they are run from the DOS command prompt, they are operating system-independent and can read any file system type (including FAT/FAT32, NTFS, OS2 and Linux). And because the default Operating System on the drive is not loaded, no critical system files are locked or not available.

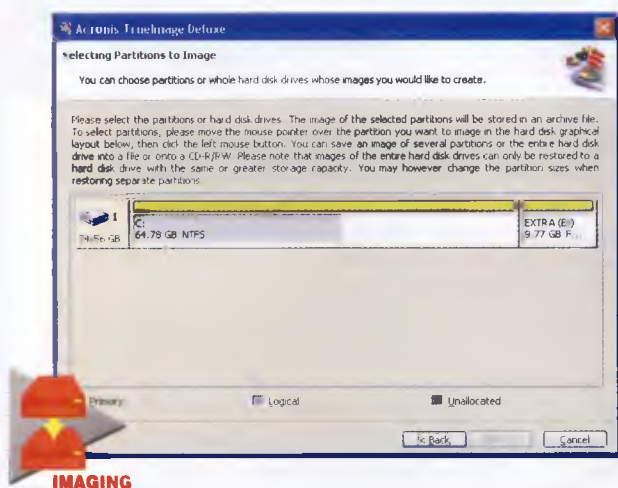
To create an image file, the software makes a backup of all information, including partition information, and every single file and folder to be found on the hard drive. This is all written to a single file, or split across files if needed, and can be compressed to save space. This image file can then be accessed and restored onto any other hard drive or partition. Some image utilities even let you go into an image file and restore only whatever files you need. Taking an image is also a security measure, as you have a complete backup of your system. The image can be transferred to some other medium, such as CD-ROM or tape to be used again in case of emergency.

Migration software is to be likened to a direct copy between two hard drives. No image file is created, and some migration software lets you select what you would like to transfer, while others just transfer everything.

Simply doing a drag and drop copy between hard drives doesn't ensure data integrity, as most applications and software store files and data in various locations throughout the hard drive, not just the install directory. Also, registry entries are critical to the correct working of most applications and thus need to be carried across. Migration software transfers all information, including personal data, registry entries and necessary files located elsewhere.

Typically, using migration software is a lot quicker than creating and restoring an image file. The trade-off is that once an image file is made, you have a recovery file in case of emergency. Both alternatives get the same job done, just in different ways. It really comes down to the individual software package to determine which way is better.





Acronis

True Image Deluxe

True Image performs without a hitch, but just falls short of being regarded as a great product.

As the name would suggest, True Image Deluxe from Acronis is for creating images of either an entire hard drive or single partition. It runs natively from within Windows and has a nice interface, but in terms of speed can't match the likes of Image Sheriff.

The interface has a very familiar feel to it, and looks similar to a Windows XP themed window. A wizard guides the user through creating an image file, asking questions pertaining to which drive or partition you want to make an image of and whether the image file should be compressed or split. After the image is created, True Image will prompt the user to create a boot disk, so images can be restored from the DOS command prompt.

Restoration of an image is just as easy, as the same wizard is used to initiate the restoration process. Simply select a target drive or partition and True Image will do the rest. If you want to restore only selected parts of an image, say a certain file or folder, True Image can virtually mount the image. This allows the user to browse through the image and select what they would like restored.

True Image performed flawlessly under testing, and all data transferred was intact and an exact duplicate of the source hard drive. The wizard does a great job guiding the user through the whole process, but in terms of documentation, True Image was a little lacking. Thankfully, the Acronis Web site is full of useful information and helpful tips.

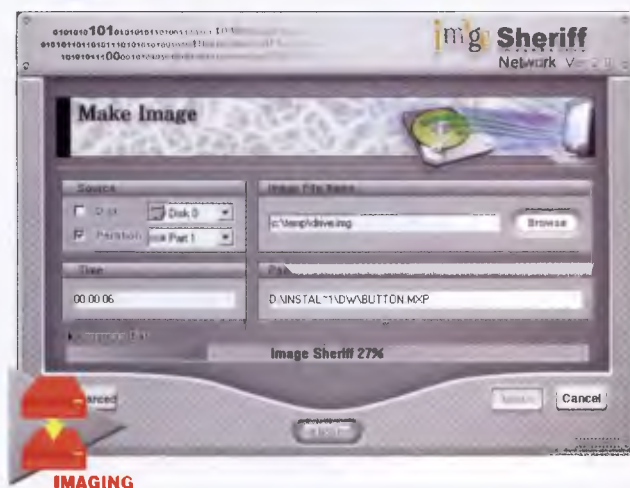


<< Details

Contact G & V Advance Electronics
Phone (02) 9666 7011
Online www.acronis.com
Price \$79.95

Verdict

- ✓ Images can be virtually mounted and viewed.
- ✗ Documentation is very light.



Jungsoft

Image Sheriff

Image Sheriff impresses in all areas as a fast and powerful imaging utility.

Image Sheriff is, for all purposes, an image creation utility. But it has a few extra tools added on to make it an all-in-one solution. Comparisons can be made to Norton Ghost 2002, but Image Sheriff is a more complete package and does the job of imaging a lot faster.

Unlike Ghost 2002, it can be run from within Windows, so there is no need to drop out to a DOS command prompt. Images can be made of either a complete hard drive or a specific partition. Compression can be used, and will result in an image file less than half the size of an uncompressed image file.

When restoring an image to a hard drive, Image Sheriff can dynamically adjust the partition size. This means that if you have an image of a 15GB partition, it can be dynamically increased to fill a 50GB partition. Alternatively, partition sizes can be left intact and transferred as is to the new hard drive.

The other utilities with Image Sheriff include a Partition Manager, which allows the user to either divide or combine partitions on a target drive. This utility works well, but is very basic when compared to the likes of Partition Magic 7.0. The other utility is a simple Drive Copy utility, which transfers all data from one drive to another — similar to Migrate Easy.

We were impressed with Image Sheriff as it was very fast and worked without any problems. The extra utilities included are basic in functionality, but help make Image Sheriff a good all-round option.



<< Details

Contact Bit Distribution
Phone (03) 9888 2005
Online www.jungsoft.com
Price \$64.95

Verdict

- ✓ Well-rounded set of utilities to complement the imaging tool.
- ✗ Some documentation hasn't been translated properly.



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41 Brady Street
South Melbourne
VIC 3205

QLD Office
■ (07) 3852 5288
Fax: (07) 3852 5299
41 O'Connell Terrace
Bowen Hills
QLD 4006

BCN Technology

www.bcntech.com.au
sales@bcntech.com.au



IMAGING



PARTITIONING

Symantec Norton Ghost 2002

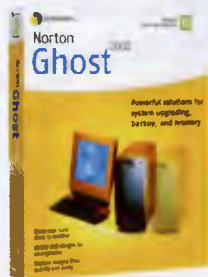
Long considered the standard for imaging, Ghost now faces some fierce competition from those with better options.

Norton Ghost 2002 takes a complete image of a hard drive or single partition to transfer data to a new hard drive or as a backup.

The program is installed under Windows, but is run from a DOS command prompt. After creating a DOS boot disk — which is done by using the Ghost Boot Wizard — select the type of boot disk you want, restart the system and the Ghost utility is loaded. The interface is bland but easy to navigate and from here the user can select any hard drive or partition that they want to make an image of.

Compression can also be used to minimise the size of the image file. A word of warning though; the image file created will be the same size as the total amount of data on the drive or partition, so using compression will be of great benefit. The only downside to using compression is that it is a little slower when restoring an image. Ghost can also be used to transfer data directly between hard drives and partitions. By using "cloning", users can quickly duplicate contents from one drive to another.

Restoration of an image file is a little more user friendly. From Ghost Explorer, you can select an image file to view. You can either restore a complete image or select various files and folders to individually restore. Another utility included with Ghost is the GDISK utility, which is a direct replacement for Microsoft's FDISK command line utility for creating and managing partitions.



<< Details

Contact Symantec
Phone (02) 8879 1000
Online www.symantec.com
Price \$129

Verdict

- ✓ Simple to use interface, images can be split.
- ✗ Expensive in comparison to competitors.



VCommunications Copy Commander

Initial impressions don't do Copy Commander justice, as it turns out to be a powerful performer.

To quickly and easily copy the contents of one hard drive to another, V Communications offers Copy Commander as a solution. Copy Commander is a no frills utility, and along with simply copying data, it has a useful partitioning utility.

Once you have your new hard drive installed and running alongside the existing hard drive, the transfer process can begin. Copy Commander is run from the DOS command prompt and can be initiated from the included boot disk or the bootable CD-ROM.

Like Partition Commander, the interface of Copy Commander has been designed to look and feel like Windows. There are three selections to choose from to begin the data transfer.

The Copy Wizard simply transfers everything from the hard drive with the data to the empty drive, no questions asked. There are also selections to copy either an entire hard drive (specifying either a 1:1 copy or expanded copy) or a partition copy. A surface scan can also be selected during the transfer process to check the target drives condition.

Copy Commander also includes a partition utility, which even surpasses some of the Windows equivalents in terms of usability.

Users can create, copy, delete and format partitions and see a graphical representation of how the partitions look.



<< Details

Contact Quadtel Marketing Results
Phone 1300 657 772
Online www.v-com.com
Price \$49.95

Verdict

- ✓ Very simple to use interface.
- ✗ May not have enough options for some



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- Support SKT478 400/533FSB
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- Support SKT478 400FSB
- On die Graphic • ADD slot
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- USB 2.0

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Fax: 61-2-8745-8499

Email: Lestiel@bluechipit.com.au

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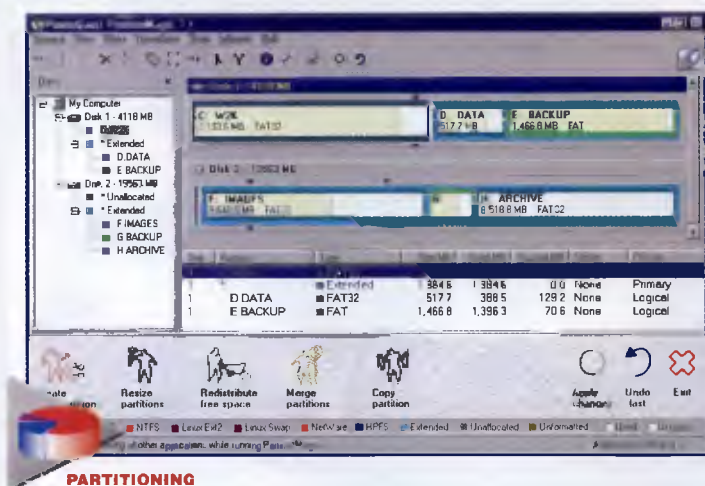
PC

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PowerQuest Partition Magic 7

In terms of usability and features, PowerQuest's Partition Magic comes close to being the perfect solution.

Partition Magic was one of the first partitioning utilities to arrive on the scene back in the late 80s, and still offers one of the best solutions on the market.

As a product, Partition Magic allows you to easily create, resize, split, move and merge partitions. All of this is achieved from within the Windows OS, though as with most Windows applications, several reboots may be needed to commit changes. The easy to navigate interface puts all options within reach and makes the program simple to use. At a quick glance you can see the current state of your partitions, size and file system type.

When creating, splitting or merging partitions, drive letters need to be assigned to reflect the new drive structure. This can lead to problems as shortcuts and registry entries may no longer point to correct file locations. Partition Magic includes a handy utility called DriveMapper, which will search the registry and local drives to reassign any now-redundant links. Under testing, this worked perfectly and reassigned all links.

For the power user wanting to install multiple OSes on their system, Partition Magic includes the BootManager utility, which controls the systems startup process. Using BootManager, you can install various OSes on different partitions, and select between them at system startup.

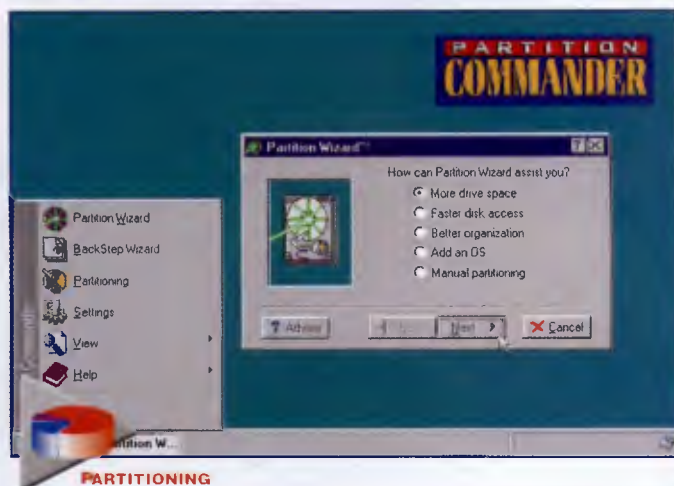


<< Details

Contact PowerQuest
Phone (02) 9521 6466
Online www.powerquest.com
Price \$129

Verdict

- ✓ Very powerful, yet simple to use.
- ✗ Some users may find the program a little too strict about confirming choices.



VCommunications Partition Commander

Partition Commander provides the basics of partitioning but doesn't really go any further than that.

If you are looking to split your hard drive into separate partitions, Partition Commander, from V Communications will do the job for you. Just like Partition Magic 7, Partition Commander is a utility to help automate the tasks of creating, deleting and resizing partitions.

Unfortunately, under Windows NT, 2000 and XP, Partition Commander can only be initiated from a boot CD. The program runs from a DOS command prompt with no real Windows interface to speak of.

The main interface is an almost identical copy of the Windows desktop and makes the program appear familiar. Partition Commander makes it very easy to create, delete and resize partitions, but cannot perform a merge. This is a serious omission as merging partitions can be invaluable tools to the professional.

A wizard guides you through the whole partitioning process which means it's almost impossible to make a mistake. A log file is also generated and can be used if you need to undo any partitioning tasks.

If you need to setup your system for multiboot with different operating systems, Partition Commander has a utility that can do this.

Partition Commander does an excellent job of basic partitioning, but with the lack of merge facilities, it isn't as complete a package as Partition Magic 7.0.



<< Details

Contact Quadtel Marketing
Results
Phone 1300 657 772
Online www.v-com.com
Price \$65.95

Verdict

- ✓ Well constructed wizard interface makes it easy to use
- ✗ Can't offer a complete set of partition utilities



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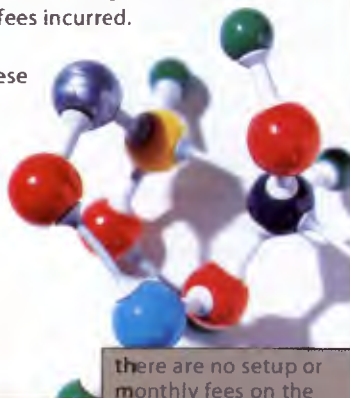


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DISK TOOL

Paragon Hard Disk Manager 5.0

A full set of utilities make Paragon's Hard Disk Manager 5.0 worthy of consideration as an all-round solution.

Hard Disk Manager 5.0 is another package that claims to be an all-in-one solution, and by looking at its specifications on paper it certainly appears so. It includes utilities for partitioning, creating images, migrating data and also a boot manager.

Paragon Partition Manager allows the user to create, delete, resize and merge partitions. Converting partitions to different file systems is also available. The interface of Partition manager is clear but isn't quite intuitive enough, and could initially be too complicated for the novice. However, after spending some time using the product you'll become familiar with the interface and realise it is quite powerful.

Paragon Drive Backup is used to create an image of either an entire hard drive or a single partition. Image creation is very quick, plus images can be compressed and encrypted for security. From within Paragon Drive Backup, you also have access to disk cloning/copying, which will transfer a partition or hard drive's entire contents to a target partition or hard drive.

An issue we experienced while copying data from one drive to another was that not all Windows profiles were copied, only the current user's profile was copied.

A boot manager rounds off Hard Disk Manager's list of tools, and is very simple to use. It automatically detects which operating systems you already have installed and creates a menu accordingly.



<< Details

Contact Lan-Net
Phone [02] 9316 5002
Online
www.paragon-gmbh.com
Price \$71.95

Verdict

- ✓ Imaging and migration within the one package.
- ✗ Some users may experience less than perfect duplication when migrating.



DISK TOOL

On Track Disk Manager 2000 v4.0

A very useful tool that holds your hand throughout the new drive installation experience.

Disk Manager 2000 v4.0 is an interesting utility in that it is targeted at the inexperienced or novice user who needs a helping hand upgrading or installing a second hard drive.

Disk Manager allows the user to choose between two options, Drive Setup and Maintenance. By selecting Drive Setup, a wizard starts by asking the model number of the hard drive you wish to set up. Disk Manager will search its internal database and if the drive is known, will display a detailed summary of specific information such as jumper settings, drive size and so on. This summary also lists the steps to be taken when installing the drive, and is to be printed before continuing.

It's at this stage that you would turn off your machine and do the physical job of connecting the drive, following the instructions. If your drive isn't listed, Disk Manager provides guidelines on common drive settings, and points you towards hard drive manufacturers' Web sites for more detail.

All going well, your newly installed hard drive will be up and running. This is where the Maintenance portion of the program is used. Under this section, you have access to tools to partition, copy files between drives and also update any references to drive letters in the registry and shortcuts. Disk Manager 2000 v4.0 is a great tool for the novice, but with no support for Windows XP may have a limited shelf life.



<< Details

Contact Software Suppliers
Phone [02] 9888 1955
Online www.ontrack.com
Price \$99.95

Verdict

- ✓ A step-by-step guide to installation.
- ✗ No support for Windows XP.



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4 USB ports, PCMCIA, TV out
MS Windows XP Home



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5.1 S/PDIF Digital Audio
MS Windows XP Home



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MS internet K/B, Mouse, Win XP Home



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7 Hot-swap SCSI Drive Bay, 420W Redundant P/S
Supermicro 4U Rackmountable Tower Case



Pioneer SOHO Server P2000

RRP \$2390

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Geeks in the hood

How secure is your home or office wireless network? Not very, seems to be the answer. William Maher and the APC tech team take a spin through the world of wireless hacking.

Something odd happened to Microsoft CEO Steve Ballmer recently. It was just a couple of weeks after Microsoft had announced it was throwing its weight behind Wi-Fi with a range of home/office hardware that allows PCs to network without wires. As the story goes, Ballmer checks into a US hotel room that's not supposed to have in-room Net access, but when he flips open his notebook, presto! There on his screen is a mysterious wireless network. Curious, he connects.

"Well, I don't know what that is. But I VPN into Microsoft. It worked! I don't know whose broadband I used," Ballmer is quoted as recalling in US industry journal InfoWorld. Before long he's calling over Bill Gates and assorted other 'Softies, who crowded into his room like excited school kids checking out the free Net access.

Discovering that free broadband can be as easy as plugging in a wireless card no doubt made Ballmer and Gates stop and think about the market they were wading into. This was not just an opportunity to bring new meaning to hassle-free networking, but also a world where it's possible to accidentally stumble across free, high-speed Internet access while sitting in a hotel room, bus stop, city skyscraper, or, if you're lucky, just lounging around at home.

"With wireless, [the old security model] has crumbled because you don't have a perimeter anymore," warns Matt Barrie, from Sydney-based security firm Infilsec. "We're certainly not trying to dissuade the technology. We think it's great."

Barrie also claims that right now virtually all deployed wireless networks are insecure and open to attack by relatively unsophisticated attackers with a laptop and less than \$1,000 of equipment. His grim assessment: Wi-Fi has opened a "Pandora's box" of trouble.

THE ENDLESS WIRELESS POSSIBILITIES

In all the excitement it's hard to know if many are listening or even care as they cruise the airwaves, wide-eyed with excitement at the possibilities. Politicians believe wireless could solve their broadband problems. IT vendors chart skyrocketing sales potential. That, and the changing social environments at large IT campuses, are all combining to make the "info-anywhere" concept an unstoppable force. Local vendor Integrity estimates that the local Wi-Fi market could be worth as much as \$15 million in sales in the near future.

This is frontier territory, where the seductive lure of plugging into invisible "hotspots" runs stronger than the fear of the hackers. Even the so-called experts are being caught with their guard down.

A technical and security expert who works with wireless technology in Australia was embarrassed recently to find someone logged onto his home PC. He agreed to tell us his story but wanted his name kept secret. "I'd be a laughing stock," he said sheepishly.

Sitting in his home office one day he noticed the bright LEDs lights on his wireless hardware flashing. A quick check on the PC found someone logged onto his PC. But who? With wireless, intruders aren't logged on from across the other side of the globe; they're

Wardriving

We're sitting quietly behind tinted windows in the car park of a major software company when our cover is blown. "Excuse me sir, what seems to be happening here?" says the bemused security officer.

There's no real need to explain: in the back of the car is a long white Yagi antenna mounted on a tripod, capable of picking up Wi-Fi signals from kilometres away. Right now it's pointed squarely over the guard's shoulder at the building behind. "I think you'd better shut down now, and leave the premises," the guard suggests.

Scenes like this are just the hazards of "wardriving", a kind of high-tech treasure hunt where people take to the streets in search of Wi-Fi networks.

With a high-gain antenna attached to your notebook, it's easy to pick up signals leaking from office windows or suburban living rooms. That unauthorised access of such networks is illegal, is not enough to deter wardrivers lured by free Net access.

The really serious turn their cars into "war-wagons", strapping antennae to the roof and installing GPS locators to pinpoint and map the location of wireless networks.

A Sydney wireless group recently held a wardriving competition to see who could find the most Wi-Fi networks. Wardrivers in Adelaide and Melbourne report finding hundreds of wireless access points, often without basic security measures, such as WEP encryption turned on. Most wardrivers claim they're only in it for fun or to learn how to secure their own networks, not to indulge in illegal hacking.



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as close as next door, soaking up signals in a radio wave hotspot. Whoever was online was somewhere right outside the building.

"I knew he was somewhere within probably a 100 metre radius of my house, which pretty much narrows it down to probably two houses on either side. So I use NetStumbler [see below] and I could actually see his MAC address and wireless device, but I couldn't pinpoint his location," he recalls. Curious, he tried connecting to the intruder but the culprit suddenly disappeared.

A week later, he was still no closer to solving the mystery. He says it's possible the intruder may have accidentally fallen into his network without realising; Windows XP actively "sniffs" the air for Wi-Fi networks, making it easier than ever for people to stumble across networks.

Accident or not, the chief technical officer still can't shake the thought that someone nearly had access to his hard drive or his Internet account. He's already thinking of a Wi-Fi stakeout — waiting and monitoring the airwaves to see if the mysterious visitor comes back. "If he wants to get in, he's really going to have to work for it now," he says defiantly.

And incidents like this are becoming more common Australia-wide, as he recounts. "I travel to just about all the capital cities and I get free Internet access in my hotel room in just about every capital city I visit. There's usually a business close by that has wireless

setup that hasn't taken the precaution to lock it off," he says. For every unsecured Wi-Fi network he finds, this travelling security expert makes a point of calling the owners to let them know, but says he often gets the cold shoulder. People don't seem ready to accept the idea that someone might be hitching a free ride on their network. "Actually, most wouldn't even let me through to the IT department," he notes.

HOW EASY IT IS

Turning into George Street in Sydney's CBD, a notebook on the passenger seat emits a stream of bleeps and squawks as we cruise downtown in the mid-week traffic snarl. We're wardriving, the buzzword given to the practise of trawling the streets with a high-gain antenna on the roof connected to a Wi-Fi-equipped notebook computer. The first step is to sniff the airwaves for wireless networks that will give us a free ticket into the Web or elsewhere.

Office towers 40 storeys high rise up on either side, blotting out the sky like some monstrous labyrinth. They call this "urban canyon" territory in the States, and it's seething with network traffic like the road below. Where wireless is mostly still a novelty in the suburbs, here the hotspots are everywhere.

There's already been a wave of panic in Sydney about Wi-Fi, especially when news emerged two years ago about loopholes in

Wardriving arsenal

Our wardriving expedition didn't require a lot of specialised equipment. In fact, everything we used was commercially available off-the-shelf hardware.

We carried three notebooks (two for primary use, and one for backup) — a Toshiba Portege 4010, HP OmniBook 6000 and Dell Inspiron 4150 — equipped with wireless LAN cards and installed with the NetStumbler utility (free to download from www.netstumbler.com).

This software is able to detect an access point's SSID, MAC address, manufacturer, network type (peer-to-peer or infrastructure) among other technical details.

It also has a view that charts the signal-to-noise ratio. In addition, it identifies whether WEP has been enabled. This tool is infinitely useful for surveying and analysing your own wireless network to find out what can be "seen" by the outside world.

The wireless LAN cards we chose were based on the list of supported hardware in NetStumbler. Both the Compaq WL110 and Orinoco Gold Card Wi-Fi PC Cards we used are based on Lucent chipsets and feature connectors for external antennas.

D-Link supplied us with two types of antennae designed for outdoor use. The first was the ANT24-1801 High Gain directional Yagi antenna rated at 18dBi. In ideal conditions, this model gives a line-of-sight range up to 5.5km. Being directional however, it's more useful for honing in on a signal than actually finding one.

That's where the second antenna came in. The ANT24-0800 is an 8dBi omnidirectional aerial that can cover a radius of 1km, depending on the landscape.

We used this most of the time as it was not only easier to handle, but more effective in detecting access points from a moving vehicle.

Simon Tsang



the encryption used to scramble wireless data. Sales to big business dropped and corporate Wi-Fi networks went under the microscope, or in some cases were shut down. "Turn it all off," blasted the emails from senior management.

In the US, cable companies AT&T Broadband and Time Warner Cable went on a Wi-Fi crackdown, warning customers that hackers could be leeching their broadband. In one airport, Wi-Fi was ripped out altogether. Locally, some big city consultancies are known to have banned wireless completely for the time being.

But for many, the lure of wireless mobility has been too great. Cruising the city streets in our wireless war wagon the laptop squawks frequently, alerting us to a continuous stream of signals leaking out from office windows high above us. The list of networks flash up on our screen, mysterious sounding names like The Missing Link, Fedtech, Tsunami, Apcity and POL Airport. By some estimation there are now more than 500 wireless nodes like these blanketing the CBD in a mesh of invisible data.

Wireless Internet providers are setting up shop here too, planting hotspots in cafes and company campuses where workers can get online over a cup of coffee. There's Airportal,

This is frontier territory, where the seductive lure of plugging into invisible "hotspots" runs stronger than the fear of the hackers



which is putting wireless into restaurants and bars. SkyNetGlobal targets airports and hotels. Wireless ISPs Alphalink and Megalink in Melbourne and Airnet in Adelaide beam data across town into homes and offices. In their haste to get online, the

security pundits worry that few are spending much time thinking about security. Infilsec recorded a 30% increase in wireless activity in the city from March to July, and only 15% of those wireless nodes had turned on Wi-Fi's inbuilt encryption to deter hackers, although that doesn't mean other security methods mightn't be being used.

Still cruising Sydney's streets, we stumble across our first wide-open network, conveniently located at a bus stop in a suburban area close to the city. The laptop bleeps, we

Warchalking

Hackers in London are manually mapping the city's wireless access points with a set of cryptic chalk symbols.

The casual passer-by would barely notice these simple yet stylised scribbles. They could as much be graffiti tags as surveyor's marks. But for those who know the code, a single glance reveals the presence of an open wireless port along with its signal strength, SSID and WEP keys. That's all they need to know for a spot of free surfing.

It's called warchalking, and it's an ironically low-tech way to open the doors to high-tech hacking.

To date there have been no Australian sightings of the chalk glyphs (developed by UK wireless boffins and detailed at www.blackbeltjones.com/warchalking), but it's inevitable that local hackers will pick up on the trend and give a helping hand to the wireless community.

The onus is on operators of wireless access points to secure their connections, or they risk finding chalked symbols sprouting on their street-facing walls and a queue of notebook-toting freeloaders at the doors.

Matt Overington

let's warchalk...!

KEY	SYMBOL
OPEN NODE	ssid bandwidth
CLOSED NODE	ssid
WEP NODE	ssid access contact bandwidth

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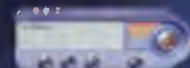


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hit connect, and suddenly it's there — a wide open Internet portal staring back at us. No passwords, no login screens, just free surfing. Even though we immediately log off, there's an undeniable rush as we realise we'd stepped inside a private digital domain.

On cue, someone in the car whistles the theme from *Mission Impossible*. We could have done some Web surfing, even sent a few emails. The contents of the hard drive weren't immediately visible, but that would only have required a little extra work by a savvy hackers.

Still, the spying game isn't as easy as it's made out to be. We spend plenty of time cruising the highways and byways and find lots of other networks, but struggle to find a way in. Outside a medical centre the laptop squawks again, then outside a car dealership, followed by an Internet café. But they're only fleeting glimpses, and when we can't find a way in we start to get the feeling there are other security measures at work that we can't see, blocking our prying eyes.

Outside the Net café we pick up a strong signal leaking out onto the street and drawing us in like a homing pigeon. This time someone's been careful; the signal's being scrambled. There's a well-known loophole past this roadblock, using special software that will sniff and crack the code, but by our estimates we'd need to sit here for quite some time before our "sniffer" could find us a way inside.

It makes us wonder why more people don't bother with these basic security deterrents. For homes, it's simply a case of turning on encryption, while businesses can install secure VPN "tunnels" as wireless entryways. People are so wrapped up in the technology they forget, like walking out of the house and leaving the keys in the front door, says Ross Chiswell, CEO of Wi-Fi equipment seller Integrity.

"You're going to see people at home using this technology and they're going to get hacked unless they stop doing this," says Chiswell. "We're now talking about suburban hacking, or neighbourhood hacking, and it's something that we probably haven't really faced before."

WI-FI WARNINGS NOT HITTING HOME

But these cautions are doing nothing to dampen enthusiasm for wireless. Revenue from local Wi-Fi sales by vendor D-Link has almost doubled over the past few quarters, jumping from \$400,000 for the first quarter of 2002 to a forecasted \$1.5 million for the three months until the end of September, while Microsoft's release of Wi-Fi network kits later this year is certain to further spur growth.



The laptop bleeps, we hit connect, and suddenly it's there — a wide open Internet connection staring back at us. No passwords, no login screens, just free surfing

Wi-Fi fever rages in Canberra too. Next month a special Federal Government committee reports on an inquiry into the potential of Wi-Fi and other wireless technology as an easy-fix solution Aussie broadband access.

Intel is exploring the possibility of a US-wide grid combining Wi-Fi and mobile phone networks. In Sydney and Melbourne companies like Azure are setting up hotspot networks in the hope of stitching up deals with ISPs.

Wi-Fi-friendly workplaces are being built at big companies like Microsoft so that data follows workers wherever they roam. In future these wireless networks will likely blanket our cities and suburbs. It's a new world of convenience and mobility, where it's possible to read your email while watching TV on the lounge, or share files at high speed with your neighbour.

But it's another matter whether anyone is listening or even cares about security right now. After 20 years of being shackled to the desk by wires the PC is now being set free. It's enough to make everyone — from new PC owners, to security experts and even Microsoft's CEO — feel just a little giddy with excitement. 

You call *that* a supercomputer?



Arrays of switches, banks of flashing lights, constantly whirring machines which could do with a decent paint job: that's the image of a supercomputer. *Justin Kranz* tracks down the true mega-monoliths of the computing world.

Ours is a complex world full of complex problems. Your average computers can handle the day-to-day digital drudge work. But when it comes to predicting worldwide climate change, mapping the stellar skies or creating an army of other-worldly hordes for this summer's big-screen blockbuster, you need more than just an over-clocked desktop. A super task calls for, well, a supercomputer.

Supercomputing is typically the domain of massive development teams with equally massive funds, whose budgets usually don't extend to a decent paint job on the final product.

But looks don't count for much. It's more about grunt than glam. As technology continues to race past last month's cutting edge, the computational power required to push development further forward again has also grown exponentially.

The real world applications for this kind of raw power abound. Today's supercomputer installations calculate global tectonic and atmospheric movement at unprecedented levels of detail, model space flight, unlocking the secrets of our very biochemical composition, analyse the performance and breakdown of nuclear stockpiles, and a whole host of other research and scientific calculations.

And, as their power and sophistication increase, the time-saving and number-crunching prowess of ever newer breeds of supercomputer ensure that just as much as they abet it, they are also a key indicator of technology's progress.

Linpack — supercomputer kryptonite

When testing the speed of machines that can occupy multiple floors of a building, you need something a little more than your trusty copy of WinBench. Commonly used as a means of measuring performance, Linpack (www.netlib.org/linpack/) is a dense system of linear equations that can be so complex that the word "staggering" seems understated in the extreme. As the complexity of the problems can be scaled and multiple tests of different sizes can be run, a reliable indication of the machine's performance boundaries can be achieved. Linpack must be able to throw up a challenging problem or two, Earth Simulator took 5.8 hours to run through it.

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Earth Simulator, Japan

Japanese supercomputers aren't as common as you'd think. So when the NEC-built "Earth Simulator" crushed its high flying American rivals to take the number one spot in the Supercomputer Top 500, the good-natured rivalry was tempered with a little patriotism too. It was also a win for the more pacifist strands of the scientific research community — given the heave-ho from the top spot was ASCI White, a leviathan whose usage is calculating the effects of age and examining operational performance of nuclear weapons.

The idea for the Earth Simulator came about after the 1995 Kobe earthquake. Following the 1997 Kyoto Convention on Climate Change (which spawned the Kyoto Protocol), conception and development of the system began. NEC worked with the Earth Simulator Research and Development Centre, a peak body comprised of the National Space Development Agency of Japan, the Japan Marine Science and Technology Centre, and the Japan Atomic Energy Research Institute.

Earth Simulator's role is to create a "virtual earth". Director of the Earth Simulator Project, Dr Tetsuya Sato explains: "The primary use of the Earth Simulator (ES) is to predict global climate changes as precisely as possible. But, the ES is devoted also to the progress of the solid earth sciences such as the elucidation of the geodynamo, mantle movement, earthquakes, etc."

The increased power of the ES allows the earth to be mapped out in a 10km grid, ten times as precise as previous methods. The odds of meteorological phenomena slipping through the cracks when the earth was scanned in the older 100km grid are a lot higher than in the new formation. As soon as the project had been completed, the machine immediately vaulted to number one on the supercomputer hit parade. Professor Hans Meuer, the "father" of the top 500 supercomputer list, was impressed. "I personally visited the Earth Simulator facility. It is impressive, a tremendous configuration," Meuer told APC.

"The Americans didn't believe the Japanese would deliver, but the Earth Simulator offers around five times the performance of [the US' previous number one] ASCI White."

Will this success story have a sequel? Dr Sato is coy. "Since this kind of simulator is expensive, what we should all do is to give clear evidences to [the] public that the investment of developing such an expensive simulator as the Earth Simulator is not a waste but an excellent benefit."



Local hero

National Facility: Australian Partnership for Advanced Computing

While Australia isn't one of the supercomputing superpowers, we do manage a creditable three entries in the world's current Top 500. Our highest placed installation, operated by the Australian Partnership for Advanced Computing (APAC) is presently ranked 42nd. Next November's Top 500 is bound to tell a new story, with substantial upgrades having occurred in August that should hopefully cement the installation's current ranking as fastest supercomputer in the southern hemisphere.

As executive director of APAC, Professor John O'Callaghan is the man with the plan for Australia's fastest supercomputer facility. "A lot of proposals were circulating in the mid 90s for high performance computer systems," O'Callaghan recalls, "[APAC was] built around an election promise in 1998."

Truly a national endeavour, APAC's founding partners included the CSIRO, the Australian National University, and consortiums of certain tertiary institutions representing New South Wales, Queensland, Western Australia, Tasmania and Victoria. South Australian representation has since been invited,

in the form of the South Australian Partnership for Advanced Computing.

The cost to get the facility off the ground? \$60 million over three years from the founding partners, and \$19.5 million from the federal government.

What kind of high performance system were they thinking of? "Five to ten times the capacity of anything in Australia," O'Callaghan reveals, "[We] took the model from the US."

APAC's supercomputer is housed in its national facility (<http://nf.apac.edu.au>). Rather than being used to focus on projects relating to a specific goal like the Earth Simulator, APAC users employ the facility's resources for a wide array of projects. The speed increase has lead to more projects being completed in lesser time. Much like any good thing, once you've had 64 processors working on a project in parallel it's hard to go back.

The future is equally bright, with the APAC national facility constantly being subjected to upgrade cycles to keep pace with demand.



APAC National Facility (nf.apac.edu.au)

Made by HP/Compaq

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Top 500 ranking 42nd

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Capacity Over 10TB of disk space, 696 GB of memory

Cost: \$79.5 million (approx) funded by founding partners and government expenditure

Usage: 30 universities and 300 users, currently supporting 150 projects

Project management

The grants of supercomputer resources are detailed at <http://nf.apac.edu.au/accounts/grants/>. Current uses of the facility include such household themes as "The Mechanisms and Thermochemistry of Flame Suppression" and "Spectral Element Methods for Turbulent Flow Simulation". Mainly with a strong biochemistry, physics and meteorological bent, casting a look over some of the project gives fresh insight into the groundbreaking work being conducted by some of Australia's finest learning institutions.

Group effort

Heidelberg Linux Cluster System (HELICS) — University of Heidelberg, Germany

Consumer heavyweights AMD and Intel are slowly but surely creeping their way into the supercomputer ranks by way of the cluster model. Clustered computing is the practice of creating an installation from a group of networked, standalone machines running in parallel.

Imagine, if you will, taking a dual P4 (or AMD) motherboard and using superfast interconnects to network them. Then, ensure you have custom applications that maximise performance across the bank of CPUs. It's these last two points (speed of interconnects and optimised applications) that are the crucial bottlenecks that prevent clusters from scaling the upper reaches of the Top 500 (HELICS, the highest ranked, manages 37th).

HELICS is trying hard to overcome the interconnect issue. Its Myricom network setup allows 2Gbit/s data transfer from node to node, and is optimised for parallel application use, unlike standard ethernet.

80 of the present top 500 supercomputers are categorised as clustered installations. The growing attraction in clustered computing is not only the familiarity in which software can run on commodity-based architecture, like Intel and AMD CPUs, it's also cost. It's not only hardware either — the HELICS cluster runs Linux, so minimal custom software development is required.

Professor Hans Meuer was involved with the HELICS configuration, and sees clusters as a useful alternative, not a replacement. "Vector technology is undergoing a renaissance... the Earth Simulator is a very good example of that. I would not claim that clusters are the only way forward".

APAC's Professor O'Callaghan agrees. "They [clusters] are a cheap form of computing power, but their performance is dependant on the way people put them together." O'Callaghan notes that bandwidth and latency of cluster interconnects and the amount of memory allocated per node still represent critical bottlenecks to cluster performance.

"Both type of supercomputers are not competitive but complementary," concludes ES' Dr Sato. "Vector-based processors have superior advantages in doing repeated computations in that all data stored in all main memories [for example, all data on grid points] are simultaneously and inseparably coupled. On the other hand, scalar-clustered processors have advantages in doing integration of many jobs that are mutually independent or semi-independent."



HELICS Cluster (<http://helics.iwr.uni-heidelberg.de>)

Made by Megware (with help from AMD)

Conceived 2002

Commenced operation 2002

Top 500 ranking 37th

Processors 512 (AMD MP 1.4GHz)

Peak tested speed 1.4Tflop/s

Physical dimensions 512 AMD 1.4GHz CPUs in paired nodes, linked by a Myrinet 2000 network

Capacity 10TB of disk space, 256GB of memory

Cost US\$1.15 million (approx)

Usage Mathematics, computer science, chemistry and "bio computer science" research

Distributed Computing

Many research bodies are looking towards distributed computing to help lessen their workload. Not a cluster in the real sense of the term, distributed computing nonetheless operates on a similar principle. Instead of networked machines housed on the same premises, distributed computing relies on the Internet to connect individual nodes. Custom software allows nodes of all different sizes and capabilities — and locations — to help lend their processing power to a common cause.

The big names of DC include the SETI @ Home project (<http://setiathome.ssl.berkeley.edu>) and Folding @ Home (APC June, page 18).

Weta Digital

Made by Weta Digital

Conceived 1998 (as one PC operation)

Commenced operation 1998

Top 500 ranking n/a

Processors 1800+ including Renderwall, FX dept and desktop — mixed across Linux and SGI workstations.

Capacity 30TB disk space online, 60TB offline storage

Usage Film production, digital effects and post production

Staff 220-230 digital artists alone

Wonderwall

Weta's Renderwall is literally all that and a box of chips. 1,300 odd to be exact. Boosted with the arrival of 900 Xeon 2.2GHz CPUs, the wall's function is to take footage of scenes from the movie and churn out final product.

It's an arduous process, and every one of those CPUs works overtime to ensure that the final product appears as soon as possible. If there's one thing the folk at Weta Digital know, with *The Lord Of The Rings: The Two Towers* being finalised and the concluding chapter in the trilogy still to come, it's that there are always more scenes left to do.

Speed of light entertainment

Weta Digital, New Zealand

When you see the massive armies sweeping down in the apocalyptic battles of Mordor in *The Lord of the Rings: Fellowship of the Ring*, or the battle of Helm's Deep in the second installment of the trilogy, *The Two Towers*, you're seeing genius in action. Not just the genius of author Tolkien and director Peter Jackson, but also the genius of the visual effects installation behind the movies.

New Zealand-based Weta Digital is the film/post production and visual effects arm of parent company Weta Limited. In creating the world of Middle Earth, Weta knew that they would have to have access to a digital production facility on a par with Lucasfilm's revered Industrial Light and Magic.

And succeed they have. Not employing a traditional supercomputer nor a cluster *per se*, Weta Digital's installation size and scope has blossomed as the effects requirements of its films have increased.

From humble beginnings in 1993 ("a single original computer, located in the backroom of an old Wellington house") to today's enterprise. Presently wrapping up the next *The Lord of the Rings* episode, *The Two Towers*, the system has undergone substantial change even between LOTR films. In addition to storage and processor upgrades, the Weta team has also opted to introduce Linux into the mix, with 250 linux workstations added and an intent to investigate future possibilities.

Despite the rendering focus being maintained on the Intel-powered Renderwall (see below), SGI still maintain a strong presence. 192 SGI 1100 and SGI 1200 servers run Linux almost all day and night in full production swing. An eight processor Silicon Graphics Onyx2 runs Discreet: Inferno, an SGI Origin 2000 server runs Weta's hierarchical storage management system, and 125 Silicon Graphics Octane workstations operate customised versions of Weta's standard 3D package, Maya.

Weta's Scott Houston explains. "In the last three months we've quadrupled our processing capacity. We've tripled our online disk storage and tripled our offline storage as well. We've done all of that while the facility has been in full operation.

It's been a very good implementation of the technology."



TeraFlops of processing power

In a tacit acknowledgment of the rise of the clustered model, IBM, Sun and Compaq/HP are making sure that they offer both types of supercomputer configuration.

Both University of Mannheim's Professor Hans Meuer, the "father" of the Top 500 and APAC's Professor John O'Callaghan agree that the real bottleneck is network latency. A "traditional" supercomputer approach builds new technology to a purpose, including interconnects. Today's clusters rely on networking technology which ranges from the distributed computing model of Internet connection through to custom network solutions such as HELICS's Myricom 2000 network setup. As the supercomputer heavyweights throw increased attention to clustered computing, expect the issue of interconnects to continue to soar in importance.

It's trends like clustering that provide real world, grounded comparisons for everyday PC users to follow. Often supercomputing is painted as an esoteric art, rows upon rows of stark cabinets bearing little resemblance to most people's perception of computing. By bringing the model closer to a commodity-based one, not only are the benefits and power more easily understood, as the hardware has already hit the mass market, the typical user is drawn closer to the cutting edge of development.

IBM, Sony and Toshiba are busy collaborating on advanced chipset technologies, codenamed "Cell". The "supercomputer-on-a-chip" project has seen the big three commit US\$400 million over five years in an effort to merge super-fast processors with broadband computing and consumer devices. No figures are available at the moment, but the phrase "TeraFlops of processing power" has been mentioned.

That's not to say that the traditional supercomputer model is ready to roll over just yet.

Definitions

GigaFlop/s: One thousand million floating point operations per second. Also referred to as Gflop/s

Linpack: Benchmarking system used to test performance on supercomputers

Node: The smallest standalone computational element in a supercomputer

SMP: Symmetric Multiprocessor System the easiest example - a dual processor motherboard based PC

TeraFlops/s: Trillion floating point operations per second. Also referred to as Tflop/s

Vector Processing: Using one instruction to perform multiple operations



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Windows 2000 Server is a powerful and at times unpredictable beast. *Serdar Yegulalp* has earned plenty of scars learning how to tame it — now he reveals a step-by-step strategy for successful installation and optimisation of Microsoft's built-for-business server.

On its own or as part of Microsoft's Small Business Server package, the Windows 2000 Server forms the backbone of many business infrastructures. But there's no reason you should break your own back rolling it out or trying to keep it running at peak performance.

There are many different ways you can put Windows 2000 Server to work for you, each with its own peculiarities and predicaments. In fact, installing the server itself is no small feat, especially if you're trying to make do with Microsoft's impossibly skimpy out-of-the-box instructions.

So we've put together this real world guide to Windows 2000 Server. This will help you survive the installation process and step right on to some simple tweaks and tunes for the Server plus several common Server-based applications.

FIRST STEPS

You should never install Windows 2000 without taking the right first steps. Depending on the kind of install you're going to make, you need to have a few things in mind.

Upgrade, clean install or dual-boot? A straight upgrade from one platform or app to the latest version tends to be less stable and reliable than a clean install, and this applies as much to Windows servers as the

desktop OS. I've encountered several instances where stepping up from NT4 Server to Windows 2000 Server resulted in a series of hassles and hang-ups that could only be avoided by wiping everything and starting over. A clean install allows you to completely throw off the shackles of the old, but you'll need to redo everything from scratch, including user accounts and reinstalling all your existing applications.

A dual boot system lets you boot the server in question to either Windows 2000 or a previous version of Windows (or another OS if you choose!), and can be useful if you're experimenting with Windows 2000 Server or a dual-boot scenario.

Note that in any case, the server in question will be offline and unavailable for the duration of the upgrade, so be sure to let your users know about the work outage!

If you're upgrading an existing Windows installation Make backups of all critical user data and system settings. This includes things like mail repositories, passwords, security information, and of course personal files.

If you're dual-booting You'll need to have a spare hard drive partition to hold your new Windows 2000 installation. It's never a good idea to install Windows 2000 on the same partition as any other version of Windows unless you're either upgrading that version or erasing it completely. Also,



if you're using NTFS as your file system, note that only other OSes that support NTFS will be able to see the Windows 2000 partition. (Windows 9x, for instance, won't.)

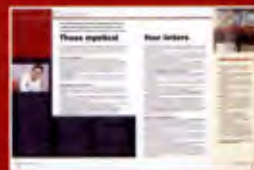
No matter what kind of installation you're doing, keep the following in mind:

- Make sure your new hardware can support the installation. Windows 2000 Server works best on a system with a 300MHz or better processor, at least 128MB of RAM, and 2GB or more hard disk space. If you're running auxiliary applications, such as SQL Server or IIS, know what more memory or CPU you'll need to support them, too. Networking should be 100MB full duplex, even if you're only running a local inhouse server.
- Make sure you have copies of all the needed applications to reinstall. This includes server applications (SQL Server, Exchange, etc.) if you use them, as well as the licenses for same.
- Do your hardware research and find out what drivers you'll need: storage controllers (especially drivers for RAID controllers), removable-device drivers (such as Zip drives), networking devices, video cards, multimedia controllers, specialised input devices, and security authorisation hardware (card readers, thumb scanners, etc.) are the most common culprits. Printers are usually something you can skip on finding drivers for until

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Active directory

Here are three things you can't afford to overlook when implementing Active Directory:

- *If your current PDC uses LAN Manager Replication and is also hosting the export directory, you will need to set up another server as the export directory host first, then upgrade all the servers that participate in replication and switch over to using AD.*
- *If you're using a multiple domain environment, think about preserving domain trusts.*
- *If you're upgrading domain controllers to Windows 2000 Server, you need to upgrade the Primary Domain Controllers (PDCs) first, then the BDCs. Note that running in mixed mode makes some new features such as AD security groups, group policies, and Kerberos authentication unavailable or limited; you'll need to use native mode to take full advantage of AD. (The native/mixed mode switch is set through the Active Directory Domains and Trust management console.)*



you get everything else up and running. Mass storage controller drivers are the most important, since you need them to get through the first stage of the installation, and some of them are not included with the Windows CD-ROM. Put those on a floppy disk as per the manufacturer's directions. If you are ever in doubt about the compatibility of a particular piece of hardware, always check the Windows 2000 Hardware Compatibility List.

Download all relevant service packs and hotfixes, and have them handy before you install. Burn them to CD-R/RW. You may not be able to get network access through the machine in question to apply the fixes if they're used to correct problems with networking, for instance.

You may want to use an export tool to bulk-export user accounts into CSV or some other flat-file format if you're starting from scratch. They can then be bulk-reimported when your installation is finished. See

www.microsoft.com/windows2000/techinfo/planning/activedirectory/bulksteps.asp for more information.

Get the most recent edition of the firmware for your machine's motherboard. Some

motherboards will not work properly with Windows 2000 without the latest BIOS.

Make note of network settings.

Servers, especially those on the public Internet, always require a static IP address which you'll need to provide manually. Don't forget to note settings

for each network interface if your server is multihomed (i.e., contains multiple network interfaces).

Note that if you're planning on using the IPX/SPX protocol, it is not installed by default and in fact is not recommended. It doesn't provide substantially faster routing than TCP/IP, and its security benefits are overrated. If you've depended on it in the past, you may want to consider taking the opportunity to phase it out at this point and replace it with TCP/IP.

ACTIVE DIRECTORY AND DNS

Most organisations that in some fashion use Windows 2000 Server are also going to want to use Active Directory, Microsoft's directory-services system, for centralising information about their users and resources.

Unlike NT 4.0, in Active Directory (AD) it has no primary or secondary domain controllers. Each domain controller in a Windows 2000 domain talks to other DCs in a peer-to-peer fashion, with AD being the synchronisation mechanism for the data in the domain. If you have nothing but Windows 2000 servers in your domain, it's called a *native-mode* domain. Conventional DCs can work with NT 4.0 Backup Domain Controllers (BDCs) in what's called a *mixed-mode* domain.

Active Directory can also work with DNS (Domain Name Service), allowing access control over individual zones or records in DNS and providing replication of DNS information between DNS servers. AD also works with DHCP (Dynamic Host Configuration Protocol), which dynamically allocates IP addresses to machines as needed, a feature very commonly used in environments with many workstations where managing static addresses per workstation is impractical. You need to host DNS on an AD controller to take advantage of AD features with DNS, but DHCP does not require AD to work.

If you're upgrading a PDC, do a domain synchronisation to make sure all changes are reflected in the BDCs. To do this, run **RDISK /S** to update the Security Account Manager (SAM) and then perform a full backup with the System State. Also, if you only have a PDC, you might want

to set up another machine as a provisional BDC while upgrading the PDC. Once you've decided which installation method to use, make sure you have everything on hand and planned your directory and DNS setups, it's time to bite the bullet.

KICK-START INSTALL: SETUP FROM WINDOWS

If you already have a version of Windows running and want to use that to speed up the installation process, use this section. If you're booting the CD itself, skip to the next section.

The Windows 2000 Server's Setup Wizard can guide you through how to upgrade an existing copy of Windows, or to create a parallel install or dual-boot (provided you have a spare partition).

The first question the wizard asks you is if you want to upgrade an existing version of Windows. This will only be valid if you have a copy of Windows NT 4.0 Server on the machine. Otherwise, you'll be asked if you want to install a new copy of Windows 2000 Server. Among the other options, two others are critical:

Copy all Setup files from the Setup CD is useful if you are not going to have access to the CD-ROM during the actual setup process.

Choose the installation partition during setup should always be checked. This lets you select exactly where Windows 2000 is going to be installed, instead of letting the machine do the guesswork. This way you can install it on a partition separate from any other OS if you're dual or multibooting.

Once you finish with this stage of the install, the machine will reboot. Be sure to take out the CD from the drive to keep the machine from booting to the CD in the next stage of setup. Skip the next section and go to "Second-Stage Install" to find out what happens next.

KICK-START INSTALL: BOOTING THE CD

If you're starting completely from scratch, boot the CD. Early in the boot process, the machine will prompt you quickly with the message "Press F6 if you need to install a third-party SCSI or RAID driver." I mentioned earlier that if your machine needs a special mass-storage driver, you'll need to supply it at this point. To do that, press F6, insert the floppy disk that has the drivers (you did copy them to a floppy, right?) and follow the prompts. If you miss the F6 prompt the first time, don't panic — just reboot the machine and try again.

If all goes well, the machine will churn for a bit and then come up with a welcome message.

Usually you will only need to press Enter to install Windows. Note that if you're installing on a system with a blank hard drive or with an incompatible file system, you'll get a warning about this, and will be asked to press C to continue setup.

After the licensing agreement (press F8 to move past it), you'll see a list of all the available partitions in your machine where Windows 2000 can be installed (see figure 1). If you don't see any drives, odds are you didn't supply the right mass-storage driver at boot.

You'll need to decide at this stage once and for all where to install Windows 2000. Note that you can install Windows 2000 on a partition that already has data on it — you don't need to wipe it clean and reformat it.

If you've chosen to put Windows 2000 on a FAT or FAT32-format drive, as opposed to Windows 2000's native NTFS disk format, you can always convert the drive to NTFS later (although you can't convert it back again without the help of a third-party program). NTFS should be what you use if you're creating a new partition from scratch, and if you're not going to access information on that partition from other OSes. FAT32 and NTFS should be used on any partition larger than 4GB.

Be warned though. If your system partition is larger than 2GB, there can be some problems with older machines. Brand new machines probably won't face any difficulties, but some older machines have trouble seeing a primary partition larger than 2GB. Always allocate a separate partition at the front of the drive (as in the above left example) for spare files, booting, and for swap space.

The size of the partition should be your main RAM size plus another 32MB. Whenever you create multiple partitions on a boot drive,

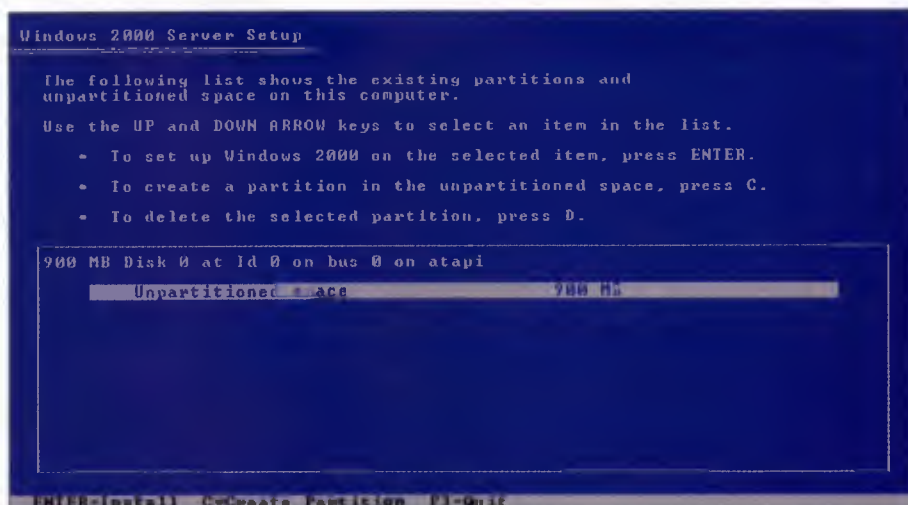


Figure 1: Setup's list of all available drives and partitions. If you don't see a drive here, you probably didn't provide the right driver for it.

Windows installs its boot-loader information in the first partition. For instance, if you create a 100MB C drive for swap space and a D drive of 1.5GB for your main Windows 2000 files, the boot loader will be installed on C (if you want the boot loader to go somewhere else, you'll need to edit this after installation is done).

Once you've chosen a drive, Setup will format the drive (if it's been designated for formatting) and then copy over all the files needed. This can take anywhere from 10 to 30 minutes, depending on the speed of your computer. After the copying is concluded, the machine will reboot (be sure to take out the CD for now), and you're on your way.

INSTALL GETS GUI

The next phase of installation takes place in Windows' graphical mode, not text mode, and begins with a wizard that detects all the hardware present in your system. This is another slow, noninteractive process; you don't have to hang around and watch this part. However, if the system hangs or produces a "blue screen of

death error" during this process, there may be a hardware problem.

Once the hardware detection phase is complete, Setup moves into the boring area of requesting regional settings (such as currency and time zone), your name and organisation, and requests the 25-character product key that came with your copy of Windows 2000.

You'll also be asked at this point for a licensing mode. Per server licensing mode lets you set up the Server to work with a specific number of concurrent trusted connections. (Anonymous Internet connections don't count; see the section on IIS for how these are licensed.)

Per seat licensing mode requires that each computer that accesses the server through a trusted connection have its own licence. A server admin should be aware of the licensing options *before* getting to this stage. Next, you'll choose a computer name and an administrative password. The computer name consists of the first name you supplied previously, plus a randomly generated tag, but you can change this to whatever you want so long as it doesn't



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Figure 2: The list of optional Windows 2000 components is a bit daunting, but most of the essential things are checked by default.

conflict with any other computer name on your network.

You'll then be asked to choose from a list of possible optional components to install (see figure 2).

Accessories and Utilities (Checked by default.) Applets and programs, such as the Calculator or the Character Map.

Certificate Services (Available only on Server.) A certification authority that lets you issue certificates for public-key security apps, such as SSL in IIS. If you're going to use Server to issue certificates for your organisation, you'll want to install this.

Indexing Service Background indexing service that builds an index of common text file formats for fast context searches across your system. This may be eclipsed by third-party programs if you are doing any content indexing.

Internet Information Services Also known as IIS, this is Microsoft's Web server, and is probably indispensable since a great many server tools use it now.

Management and Monitoring Tools Tools for monitoring and improving network

performance.

Message Queuing Services

Services that help you create distributed applications. Very useful if you're doing any multi-tiered applications.

Networking Services

Additional network components that aren't installed by default. Most servers will want to have this.

Other Network File and Print Services

File and print services that support interoperation with non-Microsoft standards.

Remote Installation Services Remotely installs Windows 2000 on remote-boot enabled computers. If you plan on distributing Windows 2000 installations through an organisation, this is a good feature to have.

Remote Storage Archives files to offline storage.

Script Debugger Debug scripts interactively.

Terminal Services / Licensing Accesses a Windows 2000 Server remotely in a graphical desktop. You'll certainly want to install this.

Windows Media Services Installs components for streaming Windows media formats from a Web server.

Along the way you'll also choose your network settings, which includes specifying this system as a domain controller. You should really have made the decision about whether this is a standalone server or a domain controller a long time ago, so don't change your mind at this stage! The last phase of installation consists of copying files, registering system settings, and rebooting, and can take as long as an hour in some cases.

Once you have the system up and running, you should make a backup of the System State immediately. This goes double if you have Active Directory running, since the System State is the only way to back up the AD database reliably. If something goes wrong during the post-installation tweaking phase, you'll at least be able to have a baseline to fall back on. (Don't forget to make backups of the System State on a regular basis.)

POST-INSTALL TWEAKING

At this point you've got a basic working installation of Windows 2000 Server. From here,

there are two basic steps: one, a set of general tweaks for everyone to follow, regardless of what purpose they're putting Windows 2000 Server to, and mission-specific tweaks.

GENERAL TIPS AND TWEAKS

Hit Windows Update and patch your system to the "latest and greatest" set of drivers and updates. If you have updates for hardware, do those first; then get service packs and post-service-pack hotfixes (see figure 3).

Defragment your drives when you're finished installing all your major applications and servers. This goes double if you've upgraded rather than installed clean.

If you're making any part of your server accessible to the outside world, unbind NetBIOS from TCP/IP for the interface that's being exposed to the outside world (see figure 4). This means that certain functionality, such as remote administration through Microsoft Management Console (MMC) applications, won't be possible, but it will make your machine a lot harder to break into.

If you're really hardcore about security, get a firewall — either hardware or software — and restrict access to the machine in all except the most essential ways.

Back up the System State. This includes a copy of settings that are not normally backed up by simply copying files. This is done through the Windows Backup utility, but is done separately from backing up files.

Make an Emergency Recovery Disk and update it any time there's a major change to disk partitions. ERDs contain crucial information about the system that can allow it to be rebuilt if there's a disaster. ERDs are also created through Windows Backup.

Consider installing a copy of the Recovery Console. This will allow you to boot a minimal version of the kernel to perform recovery operations in case something goes wrong. You can also get to the Console by booting the Windows 2000 Server CD-ROM, but having a copy installed on the system itself will make repairs much faster. See <http://support.microsoft.com/default.aspx?scid=kb;EN-US;q216417> for more on how to do this.

If you choose to make a disk image of your system at this point, either for replication or backup, you'll need to use Microsoft's System Preparation tool (SYSPREP) to do this. Because of the way Windows deals with hardware, it needs to be set up in such a way as to

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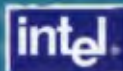
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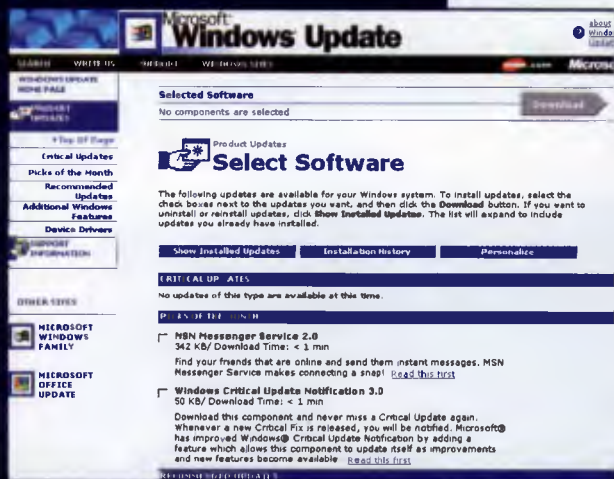


Figure 3: Windows Update contains the most recent and urgent updates for any Windows 2000 system. Hit it once a week and schedule some downtime in advance during hours of low usage.

automatically redetect changes in hardware and system state when it's deployed onto a target computer. The tool is available at www.microsoft.com/windows2000/downloads/tools/sysprep/default.asp.

SETUP SCENARIOS

Now it's time to look at several common

Best add-on software

These are highly useful for Windows 2000 Server users during various stages of the setup process. To save you downloading them, they've been included on this month's cover CD.

The quick and easy way to manage the deployment of Windows service packs across an entire enterprise is with Gravity Storm Software's Service Pack Manager 2000 (www.securitybastion.com). This checks for service packs and hotfixes in Windows NT/2000/XP, SQL, IIS, Exchange, ISA Server 2000, Internet Explorer, Outlook, and Outlook Express.

If you're trying to install Win2K Server on a system that doesn't have any free partitions,

usage scenarios. Each of these scenarios is varied and has specific advice and tips to go with it.

If you can possibly do so, dedicate one machine to a specific task: make one machine your database server, another your mail server, and so on. If you need to share machines, set things so that the applications that co-exist on the same machine don't fight for the same resources. For instance, a server that has a low-traffic Web server could also be used for your high-CPU database.

FILE AND PRINT SERVER

File and print serving sounds like the easiest thing to set up a Windows 2000 Server for. Well, yes and no. There are some quirks you should be mindful of when doing this:

Don't share out any folders without checking their permissions first. One way to tighten the system ahead of time is to remove the Everyone group (found on NTFS volumes) from Access Control Lists (ACLs) for each volume. Get the Properties for each volume in your system, grant Full Control to the Administrators group, and then remove the Everyone group from that volume; repeat for each volume in the system.

If you're using the Internet Printing Protocol to support printing from across the Internet or an intranet, you'll need to install IIS to make use of it. (If you have Windows 9x clients and

you want to make use of IPP, there's an IPP client for 9x in the Clients\Win9xipp.cli folder of the Windows 2000 Server CD; Windows 2000 includes IPP support by default, but there is no support for IPP in NT 4.0)

A machine that operates as a file and print server depends mainly on having plenty of disk space and network throughput. In NT 4.0, the network stack was tuneable; you could adjust it for network applications, file sharing, or a balance of both. By default, Windows 2000 tunes itself automatically to manage the amount of memory needed for networking, so you don't need to do this.

When sharing printers across the network, Windows 2000 also offers the option of making printer drivers available for other operating systems that may be connecting to your server. You need to have the driver in question actually available in the first place, of course; Windows 2000 just makes it installable across the network as a convenience for workstations that want to print.

WEB SERVER (IIS)

You could write a book on how to set up a computer as a Web server using Microsoft's Internet Information Server. Here are the most important things to keep in mind when installing IIS for any purpose:

Always keep up-to-date with the most recent security patches for IIS. Many of the most urgent ones are published through Microsoft Update (more on that later), but if you go to <http://microsoft.com/security>, you'll see the most recent and urgent patches published there. Check once a week.

consider TeraByte Unlimited's BootIt Next Generation 1.15 (www.terabyteunlimited.com). This shareware partition editor/resizer does everything that professional programs can do at a fraction of the cost.

To prolong the life of your server, consider using CPUIdle (www.cpuidle.de), which lowers the heat output of your CPU by throttling back on its speed during idle periods.

The existing disk defragmenter in Windows might be enough for the desktop but it's no great shakes for a server. Check out Raxco's PerfectDisk 2000 (www.raxco.com), which can defragment not only faster but more efficiently. The same company also offers a PerfectDisk

defragmenter for Exchange.

Microsoft Component Checker (www.microsoft.com/data/download.htm#CCinfo) determines the current release version of the Microsoft Data Access Components, which are used with SQL Server and any other OLE DB or ODBC-compliant application.

If you use SQL Server alone or in conjunction with a programming language like VBScript, this is a must.

Other Microsoft tools and utilities for Windows 2000 Server can be found at www.microsoft.com/windows2000/downloads/tools/default.asp, including tools for Active Directory migration and the System Preparation tool.



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at the top of your site that allows people to navigate manually to the subsites in question (in case DNS is down and they can't use host headers).

Use appropriate directory and subsite security. If you're setting up an Intranet, you can ensure that the pages on it are not accessible from the outside world through the use of the Directory Security tab in the site's Properties page. (Even easier: don't make the site accessible via the public Internet, but this also works as an additional protection measure.)

Keep track of your server certificates, which are used for secure connections through SSL (Secure Sockets Layer). Mark your calendar for a week before they expire so you can rotate them out before they are no longer valid. At least one major e-commerce site had its certificates expire for almost a week before anyone noticed, much to its chagrin.

DATABASE SERVER

Most of these tips apply specifically to SQL Server, but with a little modification they can be used with most database applications.

Immediately change the password for the SQL Server "sa" account, which is used to access all administrative functions in SQL Server. Never leave this blank.

Unless you're specifically allowing for remote administration, don't allow outside administrative connections to SQL Server over TCP/IP. Use Named Pipes, which is faster for local

processes and not as easily hacked from the outside.

Stay on top of patches and upgrades for SQL Server as well: <http://microsoft.com/sql> has the latest service packs and hotfixes for SQL Server. And be aware of your licensing options. SQL Server requires specialised licensing if you're using it as the backend for a database system that's publicly available.

MAIL SERVER / EXCHANGE SERVER

Exchange 5.5 and 2000 is Microsoft's mail server product, but it does more than just manage email: it's also a central server for messaging and collaborative work. These tips apply to both versions of the program:

As with all other server products, it's a good idea to stay on top of the latest service packs and hotfixes. Check out <http://microsoft.com/exchange> for periodic news about what's new for Exchange 5.5 or 2000.

Keep the number of mailboxes, and their sizes, to a minimum. Disk space only seems infinite until you fill it up. Exchange can be configured to start rejecting incoming and outgoing mail for a given mailbox after it reaches a certain size.

Don't allow users to create top-level folders in Exchange. This is enabled by default, and if you have a large organisation with a lot of users, you're asking for trouble if you leave this enabled.

See http://microsoft.com/exchange/techinfo/tips/Sec_Prevent.asp for more on how to turn this off. ■■■■

Turn off everything that does not need to be there. This includes removing bindings from ISAPI filters not in use, especially for things like network printing, since those are often common targets for remotely-coordinated attacks.

Make offline backups of the site tree. On my Web server, I have a batch file that makes a copy of the entire Web directory to another partition, zips it up, and sends it via email to my inbox once a week.

Your solution doesn't have to be this elaborate, but as long as you make offline backups regularly, you will be safer from any disasters.

You can run multiple Web sites on the same machine (with the same IP address) through the use of host headers, but you should only do this if IP addresses are in short supply. If you do this, make sure that there is some sort of index page

Handy online info

Here are some of the more in-depth articles on Microsoft's Web site that drill down on specific Windows 2000 Server tasks and concepts.

Migrating Domain Controllers to Windows 2000

<http://msdn.microsoft.com/library/periodic/period00/migrating.htm>

Promoting and Demoting Domain Controller to Member Server in Windows 2000

<http://support.microsoft.com/support/kb/articles/Q238/3/69.ASP?LN=EN-US&SD=gn&FR=0>

Microsoft Windows 2000 Active Directory Technical Summary

http://msdn.microsoft.com/library/backgrnd/html/msdn_actdsum.htm

Windows 2000 Active Directory FSMO Roles

<http://support.microsoft.com/support/kb/articles/Q197/1/32.ASP?LN=EN-US&SD=gn&FR=0>

Installing DHCP and DDNS on a Domain Controller

<http://support.microsoft.com/support/kb/articles/Q255/1/34.ASP?LN=EN-US&SD=gn&FR=0>

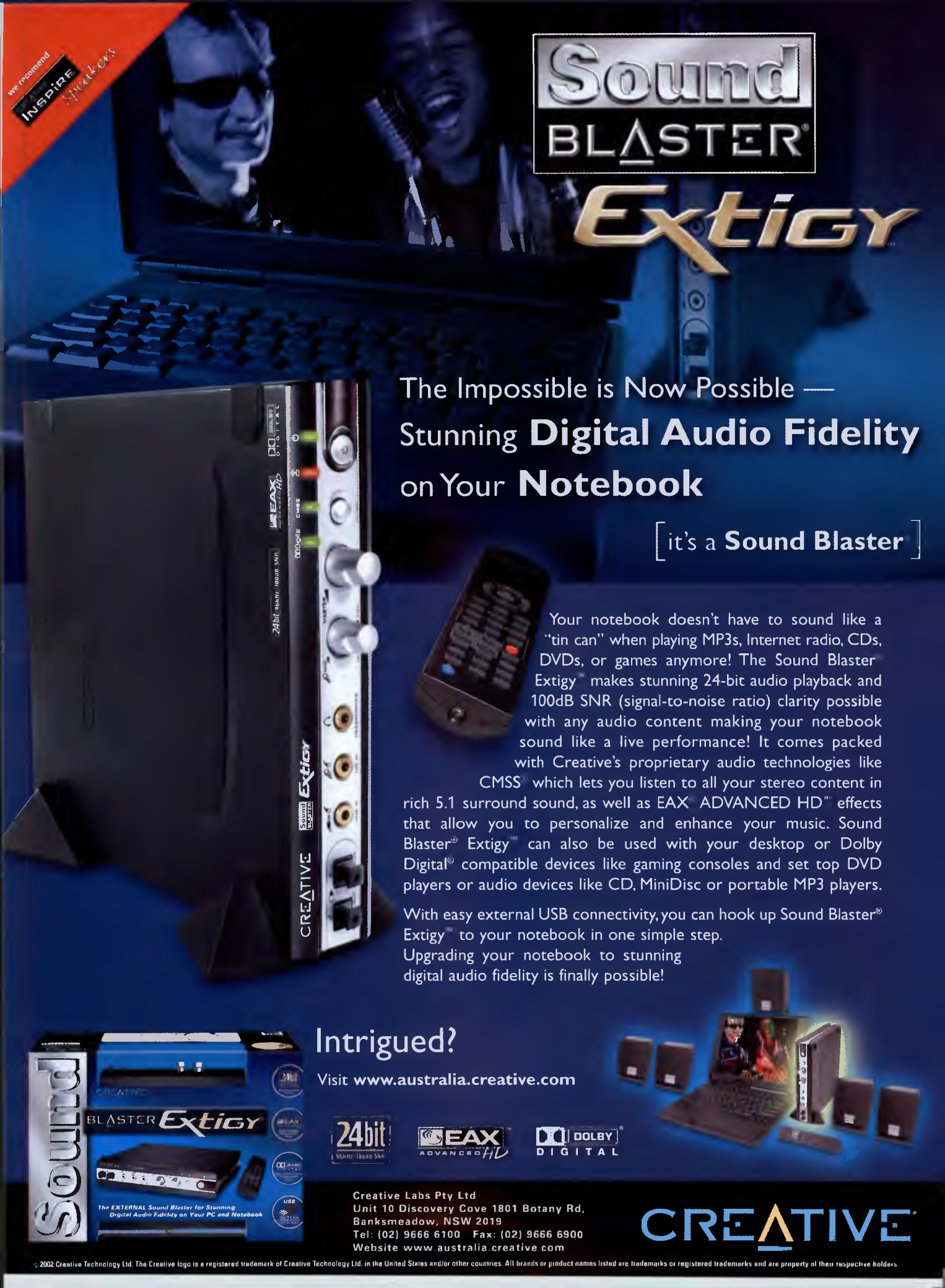
How to Convert a DNS Server to a Root DNS Server

<http://support.microsoft.com/support/kb/articles/Q231/7/94.ASP?LN=EN-US&SD=gn&FR=0>

DHCP Dynamic Updates with DNS

<http://support.microsoft.com/support/kb/articles/Q228/8/03.ASP?LN=EN-US&SD=gn&FR=0>

The JSI Inc (www.jsiinc.com) site contains a massive and continually-updated searchable database of tweaks, tips, tuning suggestions and how-to articles that are indispensable for any administrator of Windows 2000 Server.



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CREATIVE

For IT professionals, there's a four-letter acronym akin to a holy stamp of enlightenment. *Philippa Yelland* reports on the Microsoft Certified Systems Engineer (MCSE) certification and the aura it has in the industry.

Those mystical

MCSE. Producing these magical letters with your job application is like flashing some gold member VIP card for the IT industry; opening doors to better and more responsible jobs and potentially adding around 20% onto your salary. Of course, this is not the case *all* the time, but with the MCSE in your résumé, you've got a huge advantage over those without it.

THE CERTIFICATION HIERARCHY

The Microsoft Certified Professional (MCP) accreditation is the first rung of a ladder which leads to three top certificates: MCSE (Systems Engineer), MCSA (Systems Administrator) and MCDBA (Database Administrator). MCP requires one only of the many Microsoft exams offered for high-level certificates. A new certificate, MCAD (Application Developer), is a simpler version of MCSA and gives the ladder a middle rung. The new MCSA (Systems Administrator) is a cut-down version of MCSE which, for the first time, accepts non-Microsoft components from CompTIA (www.comptia.com).

MCSA consists of four exams and is also the basis of a new Dimension Data IT diploma which leads to a Bachelor of Information Technology (Networking Technologies) degree with Charles Sturt University.

MCSE REQUIREMENTS AND STUDY OPTIONS

MCSE requires seven exams: five core subjects and two electives. Four core Windows 2000, XP or .NET courses are required, plus one design course such as Windows 2000 Network Security. MCSE electives cover a broad range of areas, for example Biztalk Server Solutions and Exchange 2000 Server.

Developers have fewer courses to pass: MCAD (three exams), MCSA (four exams), and MCSA for .NET (five exams). These cover Web, Windows and XML development and use Visual Basic or other tools such as Visual C++ and Visual FoxPro.

Certain exams are particularly relevant to all the Microsoft certifications, for instance SQL Server Database is a core component for MCDBA and an elective for other certificates.

To offer their courses, vendors license trainers. Novell calls them Authorised Education Centers whereas Microsoft has Certified Technical Education Centres such as Skill Master (www.skillmaster.com.au) which is also a Novell, Cisco, Linux, CompTIA and CIW trainer.

PROFILE MATT CROWE



Matt Crowe is MCSE-certified and proud of it. After working for the ill-fated Osborne Computer, running his own consultancy and working for Unisys, Crowe is now happily employed as a Systems Engineer with Avanade, a technology integrator co-owned by Microsoft and Accenture.

Crowe acquired his MCSE when he moved to Avanade — all of the company's consultants hold the certification. Already with a Bachelor of Science (Information Technology) from UNSW, Crowe welcomed the opportunity to add the MCSE to his resume.

"I'd always wanted to do the MCSE because it gives you a certain base level of knowledge and skill in MS products," he says. "This is useful because it allows you to look at an organisation's IT needs and understand how to address their issues with the big picture in mind."

This understanding, Crowe believes, creates the opportunity to do technically demanding and interesting work on a large scale, which satisfies his career goals.

"The best thing about my job is working with teams of great people to achieve

difficult goals. I enjoy new technology, especially on a large scale, and I like to see my recommendations make a difference and add value to organisations."

Recent projects show how Crowe's MCSE has helped give him the kind of opportunities he relishes.

"I recently worked on a project where a client asked us to model the benefits of moving SAP from UNIX to Windows 2000," he recalls. "I was really showing them how to take their business in new directions — that's the kind of work we see a lot of."

Another project offered the opportunity to design a new datacenter architecture for one of Australia's top 100 companies, using

Windows 2000 Advanced Server Exchange Server 2000, SQL Server 2000 and Active Directory.

These projects demonstrate what Crowe believes are some of the best things about his job, which "allows me to express my creativity by designing innovative solutions. I also enjoy meeting and working with smart people and developing an understanding of how large organisations work. Working with Avanade and using my MCSE, I get to do that."

For others looking to find the same opportunities, Crowe recommends listening is one way to start. "Listen and you can learn almost anything," is his advice.

four letters

Skill Master's Alex Santalucia says Microsoft has used the company to train its own staff in the past. An MCSE from Skill Master costs \$10,000-\$13,000 and the newest .NET version of MCSA, \$15,000-\$17,500.

To find out more about courses, use the Internet to search for training locations, then check out and compare institutions. Visit the local office, attend seminars, ask to see course material and try to meet instructors first. And be aware of shonky operators who don't want to give you a free taste of their instruction methods.

Even though the MCSE is regarded as a career corner-stone, Microsoft certificates remain highly vendor-specific. Networking is the most important qualification area after MCSE. It's worth noting that all Cisco certificates are designed to be generic and apply to any network — there are even 3Com network experts who choose Cisco training over the 3Com "University" (www.3com.com/support/en_US/training/).

Australia's networks are 85% Cisco, so it's not surprising that the CCNA certificate (Cisco Certified Network Associate) is available at more Australian high schools than universities and TAFE colleges.

In Victoria there are CCNA courses for the VCE and the marks have a 10% TER loading boost. And why did Victoria chose Cisco and not a Microsoft certificate? Because the Cisco product is generic.

But many professionals think certification is becoming too commoditised — available everywhere with exams open to cheating by the poorly prepared.

The worst, say some, are "braindump" Web sites such as MCSEBraindumps.com which claim to provide answers to real exam questions. CompTIA has taken legal action due to braindump cheating.

More respectable are the expensive "bootcamps" (www.geekcruises.com), the most lavish of which must be the JavaJam III Alaskan Geek Cruise Java J2EE Bootcamp in September — minimum cost US\$2,600. Bootcamps offer high-pressure info, minimal hands-on experience, but they do prime students with hints and model questions.

An economical certification route is home study from well-written books. ITC Magazine's Bookshelf (www.itcmagazine.com/common/bookstore) has valuable hints, and the Microsoft Press series is also well-regarded.

WHAT THE INDUSTRY PROFESSIONALS SAY ...

Aspect Computing's Doug O'Hara says Certified Lotus Professionals (www.lotus.com.au) are almost guaranteed a job in his organisation. He warns however that the certificate is the door-opener only and, once on the job, delivered competence is all that matters.

Many IT professionals claim that training and certification help. Ed Tittel, who has contributed to more than a dozen of the *Dummies* series, believes that certification is worth 8-20% more pay in most jobs.

However not everyone is sold on the idea of IT degrees. Peter Scope, Cisco's Australian Network Academy Manager, says they are often out of touch. "A business or commerce degree coupled with certification is the way to go," he says. "Then, as much as possible, choose generic certifications after your MCSE."

On the other hand, O'Hara admits to employing many with good skills but no certificate. However his company seldom, if ever, pays for certification of employees.

From an Australian IT workforce estimated at 200,000, there are approximately 26,000 Microsoft Certified Professionals (MCPs). But, not all have the much-heralded MCSE next to their name. The certification is your responsibility and it's unlikely your employer will pay for it. You may increase your salary or become more employable but good IT jobs still go to the uncertified. **EJTB**



CERTIFICATION SELLS!

- IT professionals gain certification to increase compensation, productivity and help find employment.
- 83% of the 17,800 IT pros surveyed worldwide said certification helped them find jobs (this is up from 62% in 1999).
- 64% of the 4,465 already certified IT pros said both training and certification were beneficial.
- 66% said their salaries increased because of certification.
- Almost 50% of IT pros have been given new responsibilities as a result of certification (up 13% from 1999).
- Employers are concerned about the cost of training, employees' time away from the office, and in the increased cost of certified staff.
- More than 70% of IT pros said that they did not change employers after achieving certification.
- About 30% of those who train go on to certification.
- IT pros said certification helped them understand vendors' products better.
- 97% of the IT pros said they were more or just as likely to recommend vendors' products as a result of certification.
- 53% of the 3,000 IT managers surveyed have allocated budgets for employees' training.
- Overall, IT pros report that both training and certification are valuable to their careers for the following reasons: knowledge gain, qualification for job (certification), and skills/job productivity.

Source: Gartner Consulting and Prometric, a part of The Thomson Corporation

Radical Project Management

If, like many, you find project management a grey area, then *David Williams* says this book will clear it up and perhaps become the subject's new bible.

Five years ago I read the most insightful and inspiring book on project management I had ever seen. This was the morbidly titled *Deathmarch*, named due to the proliferation of unrealistic projects that IT teams found themselves in.

I have now found a new contender for my favourite book on the topic, in Rob Thomsett's *Radical Project Management*. Coincidentally, it is part of a series edited by Ed Yourdon, the author of *Deathmarch*.

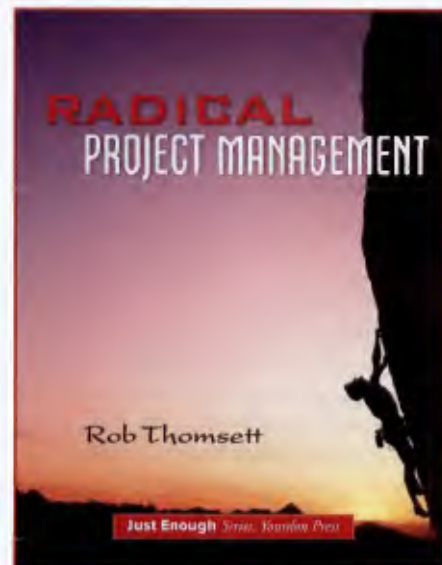
This book is novel in its approach by embracing two key facts. Firstly, project management is no longer a dry topic, best left to crusty managerial types. The modern IT professional needs to be a network guru, Web developer, database administrator, software developer and, of course, project manager. Even the most hands-on techie should be embracing this topic.

Secondly, traditional project management methodologies are losing relevance in today's wired world where the only constant factor is change.

Thomsett argues that conventional project management practices are inward-looking and static. Conversely, his philosophy looks *outward*, embracing stakeholders, management and end-users, seeking to involve them in the project's development from conception to implementation.

This is what Thomsett means by calling his philosophy radical: it departs from tradition. The term also plays on the RAD (Rapid Application Development) paradigm that propelled languages like Delphi and Visual Basic into the limelight. RAD languages also sought to involve end-users in the creative development process by allowing the rapid construction of functional prototypes.

Of course, a philosophy by itself is insufficient, so Thomsett has case studies, details of new project management tools and how to successfully use them, plus just good common-sense and stories "from the chalk face". As you read this book, it is quite clear that the author is writing from a wealth of experience. This book is



► *Radical Project Management* is highly recommended.

by an IT professional for IT professionals. Crusty managers need not apply!

Publisher Prentice Hall
Price \$84.95
ISBN 0-13-009486-2

XML Programming

The mere mention of "core reference" guides can strike fear into the hearts of even the most seasoned developers. Adding the amorphous prefix "XML" to the title should be enough to send just about any programmer running for cover. However any misgivings that you may have harboured are easily tossed aside with this book.

Topics such as XML Basics and XML Web development are clearly explained before moving into the areas of XML Schemas creation, DTDs and Web services. A significant portion of the book is focused on the .NET universe, detailing how and where XML fits in. If you're new to .NET but familiar with other dynamic platforms, this book will provide you with a good insight into .NET's architectural approach.

Code examples are peppered throughout the book and are used to highlight some of the more obvious (and not so obvious) pitfalls of XML. All the snippets are included on the book's accompanying CD-ROM.

Dan Lowden



Publisher Microsoft Press
Price \$145
ISBN 0735611858

Foundation ActionScript

With broadband Internet access becoming increasingly prevalent, users now want unique interfaces, dynamic animations and appealing sound effects without the loading times which once bedevilled such effects. Flash 5 is the dominant driving force in the provision of such pages, with its ActionScript language giving designers almost limitless scope.

Foundation ActionScript attempts to provide Flash users with the basic set of skills required to use ActionScript effectively. Initial chapters are dedicated to the most basic ideas, ranging from the assignment and use of comments and commands, through to storyboarding and timeline utilisation. Fortunately, the book quickly advances to more powerful and appealing concepts, such as applying sound and animation to events.

Although Foundation ActionScript only scratches the surface, it provides readers with a solid understanding of a language which will certainly play an important role in the development of Web-based multimedia.

Alan Crawford



Publisher Friends of Ed
Price \$71.95
ISBN 1903450322

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Neverwinter Nights

Baldur's Gate II. EverQuest. Diablo II. Justin Kranzl reckons none come close to Neverwinter Nights.

It's particularly rare to find a game that can combine excellent single player and multiplayer modes. In the case of Bioware, its highly praised Baldur's Gate series of RPGs was always stellar in single player, but somewhat underwhelming in multiplayer mode.

With Neverwinter Nights (NWN), Bioware flips the script somewhat. The single player game is still an exemplary RPG experience, but it is online (or on LAN) that NWN shines.

The storyline is well executed. A mysterious plague has befallen the land and the call has gone out for volunteers to track down the cause and find a solution. This is where your sturdy adventurer strides in.

While you can have a mercenary computer player with you at times, the only opportunity for true team-based play is in the multiplayer mode. APC's opinion is split as to whether juggling six characters at once is better or worse than going solo. In practice, it proves a worthwhile sacrifice for more in-depth character development.

The AI of CPU-controlled players can be annoying, with many obvious and irritating errors made in their pathfinding and

decision making. That aside, the single player challenge in NWN is accessible to beginners, but deep enough to keep hard-core fans occupied for the better part of 100 hours.

The beauty of this game — in both single player and multiplayer modes — is that despite the complexity of the Dungeons and Dragons system (third edition) it has adopted, it remains highly accessible.

A context sensitive menu system and commonsense GUI means that novices and hardened adventurers alike will be able to accomplish most actions in a few clicks.

Where NWN transcends all other RPGs is in its multiplayer options and tools. Players can play, generate their own campaigns, or even moderate games for other people online.

And it is in online questing that the game's lifespan stretches to eternity. With some teammates in tow, the scope of the experience is limited only by the imagination of the moderating "Dungeon Master" and the stability of your Internet connection. It can't be stressed enough how much this adds to the game.

As much as it is a game, NWN is also both environment creator, rule book and tool set. In effect, Bioware has given interested gamers the ability to create their own worlds and campaigns, something that has already caught on across the Internet.

With the official Dungeons and Dragons



Back off boney, we bagged the last VB!

license in tow, Neverwinter Nights has been one of the most hyped and long-awaited RPGs in gaming history.

The sheer scope of the title, plus the flexibility and longevity on offer elevate this into the ranks of all time gaming classics.

Online nwn.bioware.com

Price \$99.95

Warcraft III: Reign of Chaos

Blizzard teaches an old dog plenty of new tricks.

Both the Diablo and Warcraft series (with the latter's massively successful StarCraft spin off) went from strength to strength when their first sequels hit the streets. Now, after unprecedented amounts of blood, sweat, and tears from Blizzard, Warcraft III: Reign of Chaos is out and has been enthusiastically received by the public.



► If you don't clean up the corpses, you're not getting any pudding!

Much has changed in the real time strategy (RTS) genre, and Warcraft III has kept up. Units and backdrops are rendered in 3D with a level of sophistication that closes the gap between RTS and first person shooter. Plenty of tweaking options ensure that you can have things as pretty or fast (or both if you have a decent spec PC) as you like.

Forget the wry wit of its predecessors, Warcraft III's single player story takes itself a

lot more seriously. The tone is quite stern and almost too earnest. This may appeal to younger gamers, but those who have traded their hooded cloaks and spell books for 501s and a decent Nokia might find it a little tiresome.

That's about the only major complaint however. Once you jump into multiplayer mode, all is forgiven. All of the game's four races — Night Elves, Orcs, Undead, and Humans — have unique units



► She takes her love of Kiss a little too far...

and structures, and demand different styles of play. Even so, when played well the races remain reasonably balanced. This means more emphasis is placed on the new Hero units, which gain experience and power and can be resurrected if killed in battle.

On the wish list is improved handling of battle formations. More Keystone Cops than Sun Tzu, the AI is pretty much "make a beeline for the enemy". This forces the player to take a much more active micromanagement role, at the expense of other crucial aspects of the game.

But these complaints should be viewed in context. With millions of gamers worldwide to play against, and the World of Warcraft coming soon to continue the story, Warcraft III has been worth the wait. Expect it to be a fixture on many an RTS gamer's PC for years to come.

Online www.blizzard.com/war3

Price \$99.95

Grand Prix 4

A devilishly good F1 racer, but can your PC handle it?

Grand Prix 4 pushes the F1 racing genre to new heights, but how far you go is largely measured by your PC's spec. If you love smooth racing at high frames per second, you'd better be in the market for a 2GB plus CPU and some bleeding edge video silicon. On a high spec PC however, this is the best Formula One game on the market. Be a devil — your hardware vendor will love you for it.

Online www.grandprixgames.com

Price \$89.95



Smash Court Tennis Pro Tournament

Now that Lleyton Hewitt's Wimbledon win, and associated fanfare, has died down, console sports fans can safely return to the digital scene. Of course, casting a huge shadow over all tennis games is Sega's Virtua Tennis 2, which has proved to be a sublime interpretation of the sport. Smash Court also tries hard to offer a similar experience, but just falls short.

As a single player experience, Smash Court offers a variety of challenges and depth, however it does seem that the CPU players go through the motions at times. Playing with a friend makes for a lot more fun.

The presentation can get quite busy, with stylised names and text occasionally cluttering up the screen.

There is quite an intricate level of control available for the types of shots played. It may lack the accessibility of Sega's world beater, but this game has just as much depth, especially for advanced players.

Yes, there's a slight lack of polish, but Smash Court is a fine tennis title in its own right, and one that's long overdue on the PS2.

Online www.namco.com

Price \$99.95



► Thank you linesmen, thank you ball boys.

Gun Metal

Remember Transformers? Not only whacking great chunks of machinery with a voicebox, those robots also were able to turn into all sorts of useful vehicles. The mechs you get in Gun Metal may not be able to turn into your local Frigdemobile, but they do put in a handy turn as a futuristic jet fighter when stomping around on metallic feet becomes tiresome.

Gun Metal lacks the strategic elements of some of the more established mech titles, and also doesn't offer the nonstop action and carnage of others.

While there can be plenty of action occurring onscreen, don't expect to be overly

taxed. A decent array of weapons are available, but with two or three seemingly capable of handling 90% of the enemy with ease, the diversity on offer seems limited.

Gun Metal's real strength is its looks. This game is beautiful to watch, especially on later missions. Intuitive controls and excitable voice acting also help elevate first impressions, but minimal strategic play and the slightly pedestrian action means Gun Metal is best consumed in small doses.

Online www.rage.co.uk

Price \$99.95



► He shoots, he scores!

Lost Kingdoms

Nintendo games are usually able to wring playability out of the most bizarre of premises, and in the case of Lost Kingdoms, this is no exception.

Take an action game with a medieval twist, such as Gauntlet, introduce it to an über-geek card-based game like Magic The Gathering, and voila! Lost Kingdoms.

Katia, your avatar, sets out on quests armed with an arsenal of cards. When calamity strikes Katia doesn't fight, instead, she uses the cards to summon all manner of assistance.

During the course of your adventures you are given the opportunity to upgrade the powers of your cards, and occasionally

the chance comes along to boost your own strength.

Being a card-slitting medieval version of Jesse James may not be the most enjoyable experience, but in practice it does work well. The controls are powerful and intuitive, and the difficulty level is pitched just right.

The only real gripe is the length of the game. A two player mode and lots of cards to uncover gives this plenty of replay value, but if you're intent on tearing through, it can be a very short experience.

Online www.fromsoftware.co.jp

Price \$99.95



► Cover your arsenal, my liege.

XBOX

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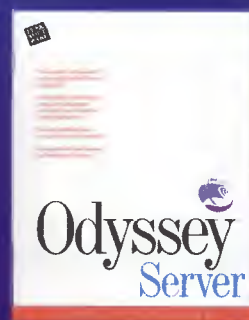
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All this straight out of the box



The Lord of the Rings

The Fellowship of the Ring

Peter Jackson's landmark treatment of the Tolkien classic outdoes itself in the transition to home theatre, says Justin Kranzl.

The tale of an epic quest to save a world from impending evil, *The Fellowship Of The Ring* sets the scene for the following two parts of the trilogy. Viewers are introduced to the characters and the history of the all-important One Ring, as well as a lucid explanation of the history of the story's crucial figures.

Director Peter Jackson manages to successfully tread that most difficult of tightropes — balancing the expectations of fanatical readers of the book with the realities of film running time and logistics.



► This DVD, with all its extras, is a must-buy.

EXTRAS

Included are three TV specials, multiple featurettes detailing the storyline and cast, a music video and more. But the real jewel in the crown is Peter Jackson's charismatic look at the making of part two of the trilogy, *The Two Towers*. Featuring footage as well as providing insight into the design and character realisation process, this is an engaging and first rate addition.

The Lord Of The Rings: The Fellowship Of The Ring could have been released "bare bones" and still sold millions. The amount of care and extras loaded into this version make this a must buy for those who can't wait until November for the four DVD special edition.

Price \$44.95

The Lost World

Based on Sir Arthur Conan Doyle's novel and produced by the team that created *Walking with Dinosaurs*, *The Lost World* certainly gives *Jurassic Park* a run for the money.

Features include a documentary and commentary from the director and producer.

Price \$29.95



Walking with Beasts

Want to see a rhino-sized carnivorous pig? If so, *Walking with Beasts* should satisfy your prehistoric mammalian cravings.

This double DVD includes the entire series, two 50 minute documentaries, fact files, photo galleries and lots more.

Price \$49.95



Black Hawk Down

Aussie Eric Bana is a scene-stealer in this oh-so-real depiction of US military operations in Somalia in 1993. Also stars Ewan McGregor and features a haunting score from Hans Zimmer. Sadly, there are few extras on this DVD.

Price \$34.95



AUDIO

Not just Dolby Digital, but rather Dolby Digital 5.1 Surround EX, which on a standard 5.1 setup sounds, well, just the same. Cate Blanchett's muted opening narration will have some spinning up the volume. As her commentary segues into a rather meaty war scene, resist the temptation. Audio imagery remains clear, even in the chaos of battle, and the bass-heavy effects will give your subwoofer a real workout.

VIDEO

Anything less than absolute visual clarity would be a sin in the eyes of cinemaphiles. The visuals thankfully are on the money, even in rapidly panning situations. CG effects translate well to DVD's clearer output, and the abundance of them in this film add to the home experience. The fellowship running for their lives through the halls of Moria is a typically taut visual experience that bears out how seamlessly CG and real actors are integrated.



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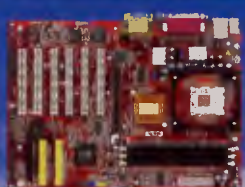
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WORKSHOP

Motherboard of the month

Asus A7V333



David Lin revisits a familiar chipset with a faster DDR333 memory bus.

Since its release in February this year the VIA KT333 has been widely acknowledged as the premium chipset for Athlon XP motherboards.

The major difference between the KT266 family of chipsets and the KT333 is in support for a new memory standard, DDR333 (aka PC2700). DDR333/PC2700 has a theoretical maximum memory bandwidth of 2.7GB/s on a 333MHz memory bus. Previously, the premium AMD solution from VIA was based on DDR266/PC2100, which was a 266MHz memory bus with a maximum bandwidth of 2.1GB/s.

However, there's more to the KT333 than the improved memory interface. AGP 4x graphics and ATA/100 disk transfer support hasn't changed from the KT266. Additional functionality includes 6-channel (Dolby 5.1 surround) sound, courtesy of a C-Media CMI8738 sound chip; ATA/133 RAID, from a Promise PDC 20276 chip; USB 2.0, from VIA's own chip, the VT6202; FireWire; and Asus' POST Reporter.

POST Reporter will supplant the usual BIOS beeps with a spoken diagnostic explaining that the BIOS had successfully booted the system before handing over operation to the OS.

The chipset is divided between the KT333 North Bridge chip, which handles the AGP and memory buses; and a choice between three VT8233 South Bridge chip variants. The A7V333 uses the VT8233A South Bridge, which upgrades ATA disk transfers to ATA/133 level. Other functions of the South Bridge include PCI, USB, audio and modem interfaces.

Nevertheless, the board layout is curious. It's a busy-looking slab with umpteen chips, switches, jumpers, capacitors and resistors taking up plenty of real estate. DIMM slots, Socket A, power, primary and secondary IDE connectors are in their usual spots but the IDE RAID connectors are located alongside the conventional IDE (where you would expect the floppy connector). This is handy if you're definitely using the RAID feature, otherwise the floppy has to be connected to a spot near the fourth and fifth PCI slots.

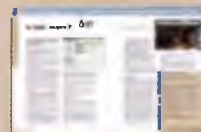
And you'll find jumpers for enabling or disabling FireWire, RAID, sound, USB, SD media, Memory Stick media, voltage and POST Reporter. The same goes for the bank of DIP switches which can be used to regulate the FSB. They can be manually set for frequencies between 100MHz to 230MHz, otherwise there is no need to note them as it's available in the BIOS as well.

Also in Workshop

130

Linux

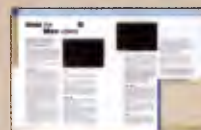
Matt Overington wonders if the trimmed-down GNOME 2.0 has more functionality, stability and a better UI.



134

Unix for Mac

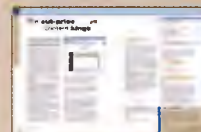
Beneath Mac OS X's cheerful exterior lies an ugly but awesome Unix command line, says Steven Noble.



140

PHP and MySQL

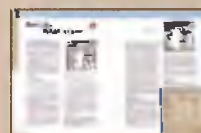
Save time with PHP and MySQL taking care of your site's content, free of charge! Andrew Phillips explains.



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Palm

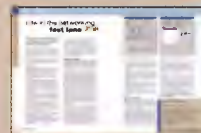
Adam Yap smashes RAM cram and unlocks about 50% more of your Palm's hidden memory.



148

Windows

Serdar Yegulalp shows you how to beat the 100Mbit networking bogies in Windows 2000.



150

PC-DVD drives

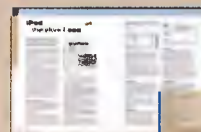
True multi-region PC-DVD drives are rare. Joe Cassels demonstrates some sneaky software that can change it.



152

iPod hacking

It does more than music, and on more than a Mac. Fiona Angus shows how to get the most out of this little Apple.



Plus: Photoshop and roll your own FTP server

IDE connectors

There are four IDE connectors in total: one standard primary; one secondary; and two RAID connectors under exclusive control of the Promise chip.

Promise PDC 20276 chip

The ubiquitous Promise RAID controller chip. Only comes into play when four identical hard disks are installed.

DDR DIMM slots

Three slots that will take a maximum 3GB of PC 1600/2100/2700 DDR RAM.

VIA KT333 chip

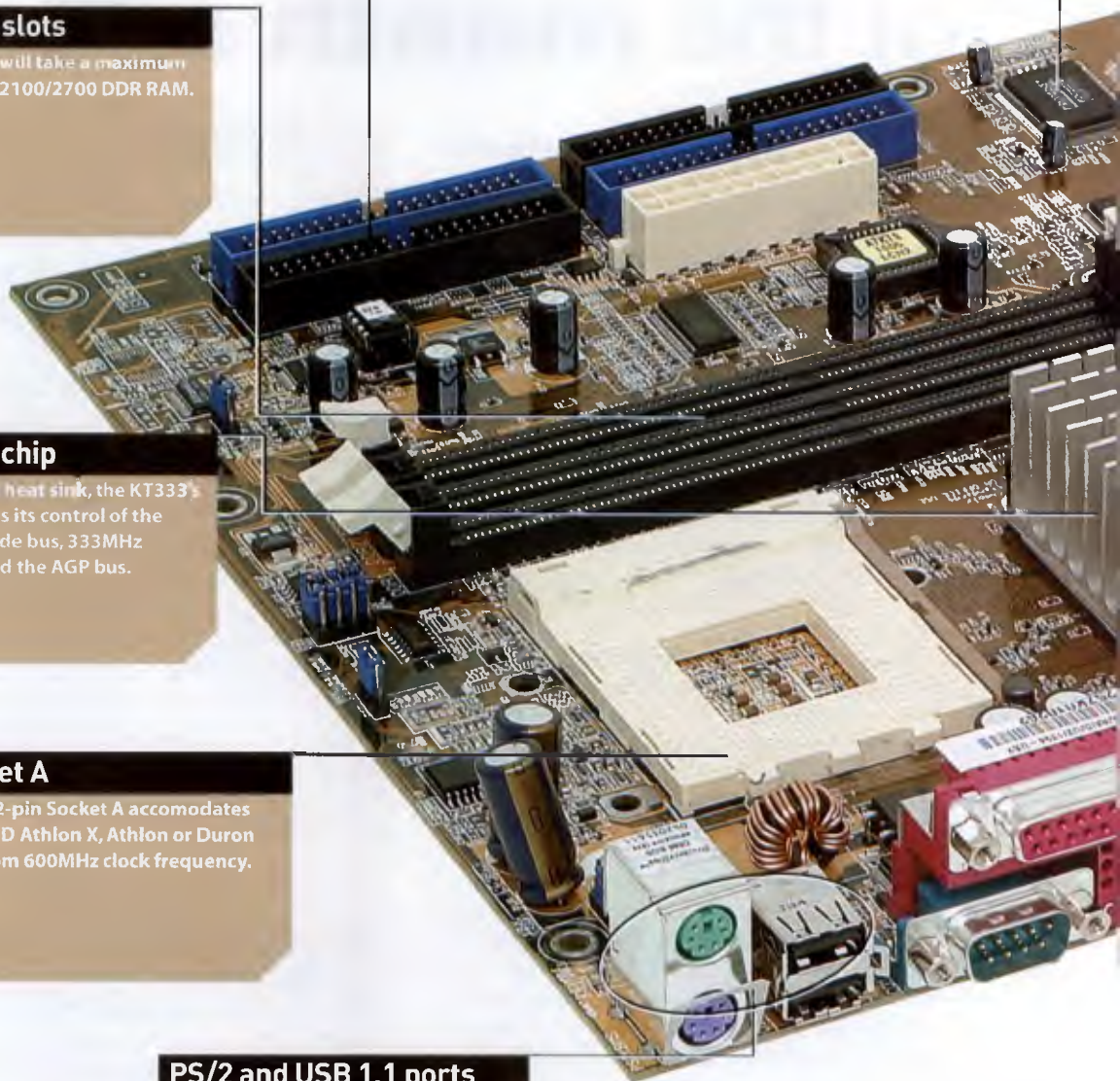
Obscured by its heat sink, the KT333's main attribute is its control of the 266MHz frontside bus, 333MHz memory bus and the AGP bus.

Socket A

The 462-pin Socket A accommodates any AMD Athlon X, Athlon or Duron CPU from 600MHz clock frequency.

PS/2 and USB 1.1 ports

This board is unusual for differentiating between USB 1.1 and USB 2.0 ports. The USB 2.0 ports are further along next to the audio connectors.



VIA VT8233A chip

This is the chip that handles USB 1.1, modem interface, PCI and ATA/133 buses, audio and other I/O systems like the keyboard and mouse. Also known as the "South Bridge".

Floppy drive connector

An unusual position for the floppy connector. Could be awkward if your chassis places the drive too far away for the cable to reach the connector.

Specifications

462-pin Socket A (Athlon/Duron) motherboard
VIA KT333/VT8233A chipset
3 x DDR memory banks supporting a maximum
3GB of PC1600/PC2100/PC2700 DIMMs
266MHz FSB
4 x USB 2.0 ports
(two as on-board headers)
4 x USB 1.1 ports
(two as on-board headers)
2 x FireWire ports (only one can
be used at a time)
C-Media CM18738 6-channel sound chip
ATA/133 and ATA/133 RAID support
PS/2 mouse and keyboard
1 x games/MIDI port
1 x AGP Pro slot
5 x PCI slots
2 x serial ports
1 x parallel port
1 x audio line-in
1 x audio line-out
1 x microphone

C-Media audio ports

Onboard sound gives 6-channel (5.1 speaker) support.

VT6202 chip

This is VIA's USB 2.0 host. At this point VIA is still offering this arrangement although an integrated solution like Intel's ICH4 chip is due soon.

Rear audio ports

Colour-coded: blue is line-in; green is line-out; and red is mic in.

USB 2.0 ports

Normally a game or MIDI port is found here, but Asus has placed a pair of USB 2.0 ports here instead. The games/MIDI port is provided on an expansion bracket.

<< Details

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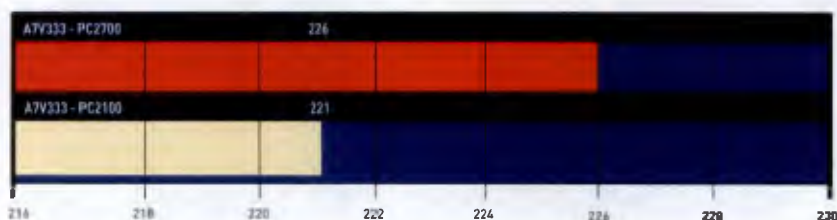
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PERFORMANCE

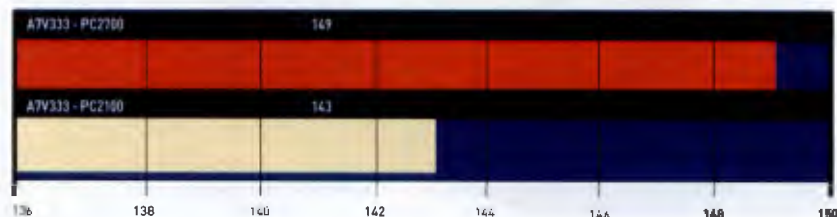
The testbed to compare against this month's motherboard is the same as last month's CPU Face-Off (page 56). The system is based on the Gigabyte GA-7VRXP motherboard. In a performance comparison with the A7V333 there's very little to distinguish between them.

MOTHERBOARD TESTING RESULTS

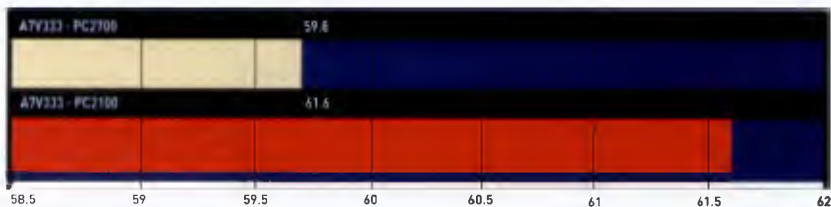
Sysmark 2002 Internet Content Creation



Sysmark 2002 Office Productivity



Winstone 2001 1.03



3DMark 2001 Pro



HOW WE TESTED

The same Athlon XP2200+ CPU and 512MB PC2700 DDR modules were used in the A7V333 as were used with the GA-7VRXP. A fresh install of Windows XP Professional was made on a brand new 80GB Maxtor D740X ATA/133 hard disk followed by the latest BIOS, driver and operating system updates. APC's former Editor's Choice winner (June, page 51), the Gigabyte Radeon 8500 Deluxe card, was also installed to keep the comparison as similar as possible.

Benchmarks run included Ziff-Davis' Winstone 2002 version 1.03 and Winbench 99 version 2.0 (available from www.etestinglabs.com), BAPCO Sysmark 2002 (www.bapco.com), Mad Onion's 3DMark 2001 Pro (www.madonion.com) and the Quake III Arena demo (available from www.quakefiles.com).

Winstone and Sysmark are application-based benchmarks which run scripts founded on actual commercial software applications like Microsoft Office XP, Lotus Notes and Adobe Photoshop. They give an account of how the system performs under a real-life workload.

Winbench is an artificial benchmark which specifically tests disk and graphics throughput. Scores are normalised and a composite Graphics and Disk Winmark score is generated. 3DMark 2001 is a 3D graphics-specific artificial benchmark for DirectX.

It focuses primarily on gaming performance. Scores are generated in 3DMarks. All testing is done at 1,024 x 768 pixels x 16-bit colour depth except for 3DMark 2001 which is at 32-bit colour depth.

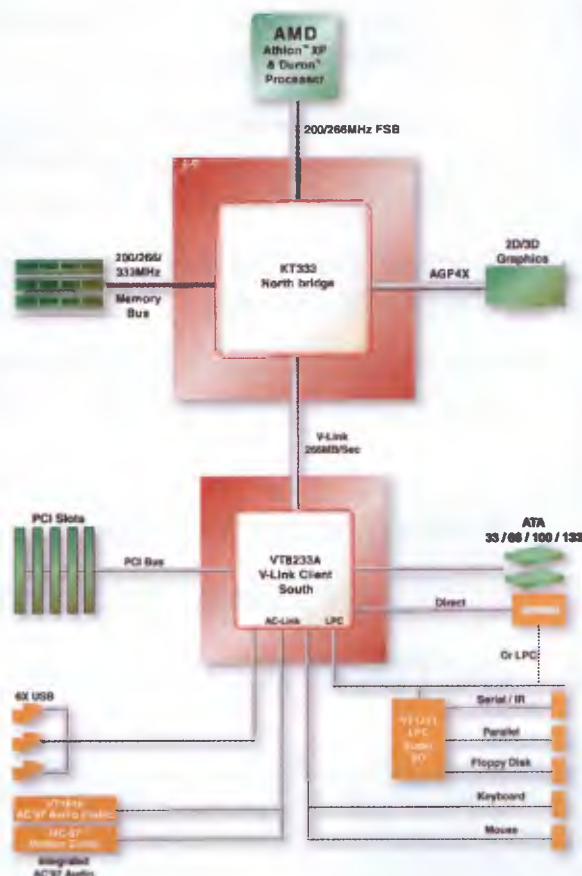
These four benchmarks are all recognised and respected standards throughout the industry. The Quake 3 Arena demo is not a commonly stressed benchmark but is widely used by gamers for OpenGL testing.

Scoring is reported in frames per second (fps). Demos are run at 640 x 480 x 16-bit for raw OpenGL framerates and then run at 1,024 x 768 x 32-bit as a system stress test.

TWEAKING

AMD systems have been popular with overclockers and tweekers in the last few years for their ability to manually extract additional performance over the published specification of a component. Short of unlocking the Athlon XP multiplier on the CPU itself, there's ample support within the BIOS to wreak tweak havoc on the A7V333.

Combinations of CPU/PCI frequency and CPU/Memory frequency are adjustable in 1MHz steps once the CPU clock has been set to manual, but don't be surprised if the system locks up. There is also the ability to modify standard motherboard SDRAM timings. Even more suspect is the CPU VCore adjustment which sets the voltage running to the CPU, an operation that is not recommended. Ultimately the most serious tweak is to modify the CPU's multiplier which opens all possibilities to the user.



► VIA's KT333 chipset offers a range of "South Bridge" modules (shown on this diagram as the V-Link Client South block). The base model 8233 supports ATA-100; the 8233A version supports ATA-133; the 8233C supports ATA-100 and also includes an integrated 3Com Ethernet MAC controller.

Boosting bandwidth

If we are to focus on the benefits of the KT333 and its support for DDR333 memory, a more appropriate comparison is to test the A7V333 with both PC2700 and PC2100 memory. The performance graphs (to the left of this page) show how the memory configuration, with no tweaking or other intervention, influences overall system performance.

Of course the raw memory bandwidth scores seen here will not always translate to actual real-life performance gains. However, it's still indicative of the advantages gained by opting to make best use of the capabilities.

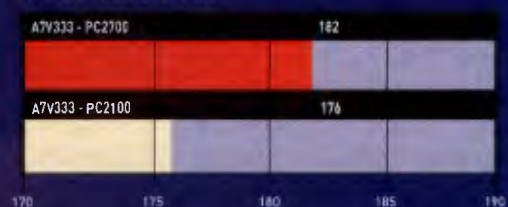
The 2.4% gain in overall bandwidth using PC2700 memory equates to a 1.5% improvement in 3D Marks and 3.5% in Quake. The Quake demos used in benchmarking are designed to stress the system, especially the processor and memory buses, by running at an imposing 1,024x768 pixels at 32-bit colour depth.

There was a hiccup in 2D testing with Winstone showing a marginally slower result using PC2700 than when it was run with PC2100 RAM.

The best advice for DDR333/PC2700 memory is that it's worth the premium over the DDR266/PC2100.

Bluechip Infotech quoted \$160 for 512MB of DDR333 and \$120 for DDR266 at time of writing. So, if you're planning on using it in situations that require the extra bandwidth for example, 3D, then this is a good option.

Quake 1024 x 768



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Is less more?



Matt Overington wonders if the trimmed-down GNOME 2.0 really delivers more functionality, stability and a better UI.

If you're after a robust, simple, and stable desktop environment, join the queue of other Linux, Unix, FreeBSD and Solaris users. The perfect desktop is yet to be developed — each user has different demands and ideas as to what is “good” or “bad.” However, what all users agree on is simple: they want something that works.

GNOME 2.0 is a right direction with a completely revamped interface and configuration system that deviates from tirelessly adding features. Gone are endless reconfirmation dialogues and page after page of setup screens. These are replaced by simpler operating paradigms that help make GNOME 2.0 easier to use than its predecessor.

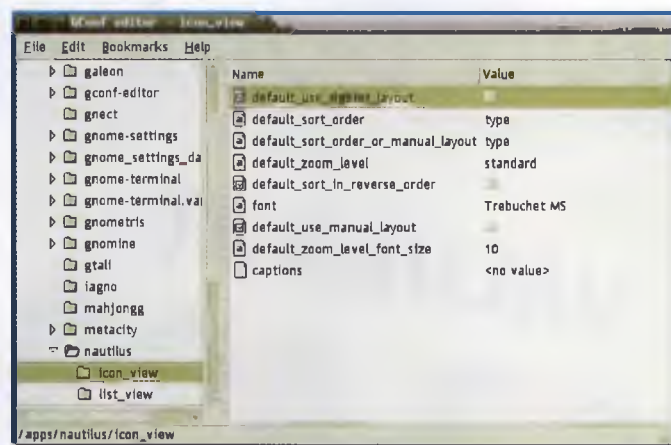
Where Linux users on a whole embrace the “less is more” philosophy, the developers working on GNOME 2.0 have taken the notion to an almost zen level. Much of the user interface has been stripped out or cut back, giving an operating system that is more robust and simpler to configure than earlier versions.

The first increment of the GNOME desktop environment was atrocious. Major bugs in most of the core components meant that the entire desktop would crash several times a day. Buggy, unstable, and supported by a far-from-perfect set of tools in the form of GTK1, GNOME 1.0 was ammunition for Mac and Windows users who sang the praises of their GUIs and sneered at Linux.

A few modifications were made, and it wasn't until GNOME 1.4 that developers managed to squash most of the bugs that plagued the early releases. This time, GNOME thinks it has it right. Now that a full release is finally here, was ask: is it really worth the hype? GNOME 1.4 is the version most directly superseded by the release of GNOME 2.0. GNOME 1.4 is one of the most popular desktop environments, and a strong developer base already exists.

Not all distributions are bundled with it — for example KDE is heavily favoured by SuSE — but you can still get GNOME up and running on most distributions without a problem. The entire GNOME 2.0 desktop environment download is 341MB, a huge download by anyone's standards.

As with any new desktop environment or operating system, application compatibility is a key concern for anyone running bleeding-edge technology. A number of applications have already been updated: Mozilla, Nautilus, XMMS and Galeon all enjoy native GNOME 2.0 versions. Extra software will make its way over to GNOME 2.0 eventually, but in the meantime you



► GConf is one of the big surprises of GNOME 2.0. A functional, integrated configuration system like the Windows Registry editor.

will probably want to preserve an installation of version 1.4 on your desktop to avoid compatibility problems. The older version will run side by side with its replacement, and this is definitely the best way to go to ensure that your software will still run.

Previous versions of GNOME relied upon bolt-on XML support, but version 2.0 is the first GNOME release to feature built-in XML libraries. Libxml2 is bundled, and provides the most complete and standards-compliant free XML libraries available for Linux.

Operating systems across all platforms are rushing to beef up in expectation for the next generation of computing models to take hold, and GNOME 2.0 is a step in the right direction.

GETTING TO GNOME YOU

One of the most confusing areas of Unix or Linux operation is installing new software. The RPM system employed by Red Hat is an attempt to simplify the software installation into a Windows-style executable package, but it's not portable across all flavours.

Installing GNOME 2.0 is a time consuming and arduous process, and is not for the faint-hearted. If you've never built Linux packages before, there is a good chance that you would want to start with something smaller than a full desktop environment. However, if you're experienced, or feel that you're ready to bite the bullet and get intimate with your computer's inner workings, then compiling your own GUI is about as hardcore as you can get (without rebuilding the kernel).

► *Transparent windows have been improved in GNOME 2.0 and are now stable enough to use regularly.*

You will need to download all the installation packages if you are after the full functionality of GNOME. All these packages can be downloaded from www.gnome.org, or you can save yourself hours and costly Internet bills by using the packages on this month's cover CD. The full installation is around 60 packages, although you will have to install fewer if you are running a modern, up-to-date build of Linux as many of the packages will be duplicated.

You'll find detailed instructions on how to install GNOME 2.0 under Debian, SuSE, Mandrake, FreeBSD, Ximian, Sun Solaris, Gentoo and Rock Linux at the GNOME Web site (www.gnome.org/start/2.0/). You can also download the source files in case you would like to build for alternate distributions.

Pay attention to the build order, as each package has to be installed in order for the entire application to work correctly. Load up the Workshop section of this month's cover CD for links to instructions on how to configure and build GNOME 2.0 for your personal Linux flavour.

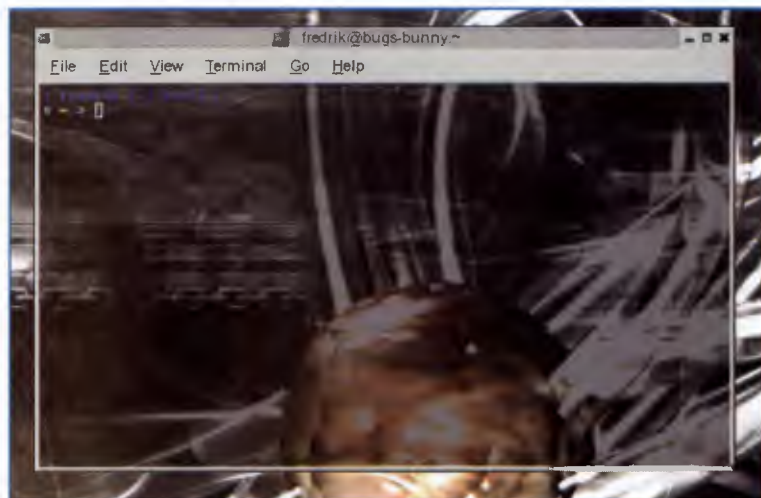
SOUNDS OF SILENCE

Once GNOME was up and running in the APC labs, we were initially puzzled by a lack of sound from the machine. We loaded up the environment and tried to play an MP3, but were met with silence. We thought that our audio subsystem had somehow malfunctioned during the installation of GNOME 2.0, which seemed unlikely. It turned out that the esound daemon isn't turned on by default. This seemed a peculiar choice, as you'd assume that most people would want to boot the computer with the sound enabled.

The first time you pass the introductory splash screen, you can't help but draw comparisons between GNOME 2.0 and Mac OS X. The attention to detail in the artwork is a contrast to the traditional function over form appearance of previous versions. The icons, although not animated, have been improved, and scrolling and fading effects have been added to help give a more streamlined interface.

The appearance of GNOME 1.4 has been left antiquated by the visual feats of Windows XP and Mac OS X. Small changes have been made to the way the menus scroll open and behave under the mouse — these are more user-friendly and aligned with modern GUIs. For example, diagonal mouse movements are now allowed under the menu systems, so you don't have to be as precise with your mousing, and you can freely drag-and-drop items on the screen.

Like BeOS, you are free to drag windows between workspaces in GNOME 2.0. The Workspace Switcher applet



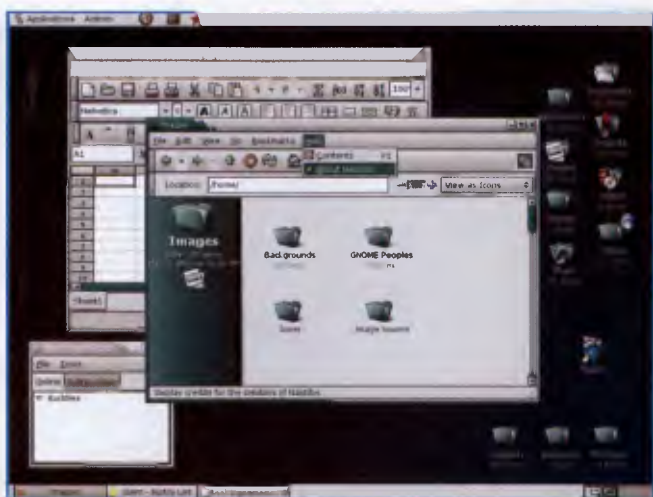
takes care of moving the data between windows for you, so you aren't tied to working on a specific window.

ONE FOR ALL

One of the most obvious changes between GNOME versions 1.4 and 2.0 is that an effort has been made to create holistic desktop. Previous versions of GNOME left users feeling like they were using a collection of tools that had been loosely bundled together into the one release. With GNOME 2.0, the experience is more uniform. The menu systems all behave the same way, as do the systems for navigating Nautilus and handling files. Confirmation dialogues and a simplified configuration tool all help streamline the experience.

Hits and misses

- ✓ **Artwork:** painted icons to well-drawn borders and window frames, GNOME 2.0 looks slicker and smoother than its predecessor. It's even slightly faster.
- ✓ **GConf:** a Windows registry-like tool that is used to customise GNOME according to your taste. All selections are in plain English, so you don't have to worry about getting your head around strings of hex characters.
- ✓ **Updated interactivity:** there is no more "applying changes" after you've run through a screen of configuration options. When you make changes to radio buttons in GNOME 2.0, the environment is updated instantly.
- ✓ **XML Support:** GNOME 2.0 is the first GNOME release that features built-in XML support via libxml2 and libxslt. libxml2 is one of the most complete and standards compliant-free XML libraries to be found.
- ✗ **Menu bar:** part of the allure of Linux stems from its customisability. The fact that the menu bar is locked in place at the top of the screen will be enough of a negative point to deter some users, particularly those that run virtual machines.
- ✗ **Reduced access to preferences:** in an effort to simplify the environment, GNOME developers have removed preference panels for a number of options, including the screensaver chooser.



There are also new menu systems and confirmation dialogues built into the desktop, which slightly change the way that you use Linux. Members of the open source community responsible for the development of GNOME 2.0 have opted to do away with the traditional OK/Cancel buttons on most dialog boxes in favour of a single Close button.

When you click a radio button on any of the configuration screens, the change is taken care of straight away. For example, if you are changing the way the screen appears you don't need to set each option and then click "Apply" to see your modifications. Instead, each modification is presented in real time as the changes are made.

Not all of the modifications have been positive ones, however. One of the most annoying interface changes has been made to the top menu bar. Instead of being floatable, it is now fixed at the top of the screen and permanently visible — you can't even set it to auto hide.

The GNOME help file indicates that the bar cannot be moved or hidden, which seems an obvious detraction from Linux's customisability.

There are times when you need access to all the screen's real estate, and cutting off a defined section of it with no flexibility seems a choice that will hurt GNOME 2.0. If you're using virtual machines, then you will want access to the top bar of the client's machine, which isn't possible under GNOME 2.0.

In GNOME's quest to simplify the environment and trim

► Nautilus has received an upgrade to make use of anti-aliased fonts, and also benefits from quicker launch times and enhanced stability.

back the user options, the developers have gone over the top and have removed preference panels for a number of configurable elements. There is no preference panel for screensavers, so if you want to customise the screensaver you have to manually edit the configuration file. This is a hassle, and is a step backwards from GNOME 1.4.

EASY ON THE EYES

One of the immediately obvious effects when first loading GNOME 2.0 is the anti-aliasing of screen fonts. All text on the screen has smooth edges, which can actually be hard on the eyes for someone who operates with a number of windows open at once.

Feedback in the GNOME discussion groups has this feature earning roughly equal amounts of bouquets and brickbats, so it's something that is a personal choice. There is no preference menu to change the status of the anti-aliasing, but you can edit the conf file and disable it from there. A number of new fonts are also included with GNOME 2.0.

These changes are positive in that they simplify the user experience, which is what will ultimately drive Linux to the mass-market. On the other hand, part of the allure of Linux is held in the ability to get up to your elbows with how both the user interface and the underlying subsystem of the OS runs.

GNOME 2.0 contains a configuration tool called GConf that works like the Windows registry editor. You are given a number of warnings when you first load it, but if you click through them you are rewarded with one of the best configuration systems available. GConf is a central configuration utility that can be used to tweak the majority of the options within GNOME 2.0.

You don't need to worry about comprehending and working with long strings of characters or hex-codes, as all the information is presented in plain English. Thankfully, you can review the explicit outcome of your changes before you commit them to disk.

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Applications like the GIMP are being upgraded for GNOME 2.0, although in the meantime it's a good idea to run both GNOME 1.4 and 2.0.

In keeping with the complete redesign it didn't surprise APC that GNOME 2.0 runs faster than its predecessor. Not only does GNOME 2.0 outperform earlier versions for a number of tasks, but was generally way ahead of Windows XP on identical hardware.

On a 500MHz Pentium III with 128MB of RAM, Nautilus took three seconds to open a new window using GNOME 2.0, versus just over five seconds under version 1.4. Launching a new Explorer window under Windows XP clocked in at a shade over four seconds. It isn't just spawning new windows where GNOME 2.0 wins out, though.

Loading a sample Web page from the hard disk under Galeon and GNOME 2.0 took five seconds, while its predecessor lagged by two full seconds. Opening Web pages, copying and pasting files, and even launching productivity applications like OpenOffice.org was consistently zippier under GNOME 2.0.

SQUASHING THOSE BUGS

There are still some minor bugs that need to be ironed out. The ongoing bug-tracker list at <http://bugzilla.gnome.org> reports that there are still 1,500 bugs at the time of writing, with more being discovered and squashed daily.

Unfortunately, we managed to crash Nautilus completely when trying to open an AVI file with a corrupted header. The system appeared to hang and it required a hard reset to continue, but when we tried to recreate the error, we failed.

The changes to the UI will not make everyone happy. On the most part, GNOME 2.0 is easier to navigate with the mouse than previous versions, and a conscious effort has been made to unify the appearance of windows and menus.

The real time updates, and only having a "Close" button to work with, will annoy many power users, who will feel as if some level of control over the operating system has been removed.

These concerns are largely unfounded, though. The useability has been enhanced if anything, and GNOME 2.0 will open Linux up to a new group of users that aren't willing to sacrifice aesthetics for performance.

WHY THIS GNOME FALLS SHORT

The overall user experience is not particularly impressive. In short, GNOME lacks a bit of polish. There has been a good deal of pressure put on the GNOME developers by the online community to rush an update to market.

As a result, although GNOME looks and feels slick, it is missing some features — mainly in preference panels — that are expected in a Linux desktop environment. Furthermore, GNOME 2.0 shows a change in computing models



from GNOME 1.x — with that "less is more" philosophy. Subsequent releases look to stabilise and build on the existing GNOME 2.0 platform (check the GNOME plan at <http://developer.gnome.org/dotplan/> for more information).

However, there is no doubt that GNOME 2.0 contains enough goodies to satisfy the thirst of any bleeding-edge technologist who simply must have the latest and greatest.

And as for the rest of the Linux community, APC's advice is one of caution: Linux-heads should wait for the release of GNOME 2.2 before jumping on the bandwagon. **ETC**

GNOME on the Web

Many Web resources exist to help you get GNOME 2.0 up and running on your Linux box. Here are some of the best ...

www.gnome.org: the horse's mouth. Here you will find the latest news, updates, links and portals to GNOME 2.0. You can also involve yourself with the development of GNOME and help squash bugs.

www.karubik.de/gig/2.0/index.html: the GNOME Installation Guide. The GIG has been written by Karsten Reincke to help make the transition to GNOME less daunting. It provides detailed setup instructions, laced with troubleshooting and tweaking tips.

www.fh-wilhelmshaven.de/~akcaagaa: download a CVSGnome build script that will automatically copy and install all the GNOME 2 packages for you. Although this will greatly simplify the installation process, it still requires some tweaking before it will work perfectly.

<http://sunshineinabag.co.uk>: here you will find a number of desktop themes that can be installed into GNOME 2.0 to customise the appearance. It is designed to be a central resource for all GNOME related themes.

Workshop

Unix for Mac users

Beneath Mac OS X's cheerful exterior lies an ugly but powerful Unix command line.

Steven Noble goes under the hood.

If merely using your Mac is not enough and you actually want to control it to the nth degree, then you'll be happy to find that there's a Unix command line beneath the surface of Mac OS X. Perfect for every task from advanced Web programming to scientific software development, the command line is there thanks to Apple rebuilding its system software so that it will benefit from the stability and flexibility of Unix.

We'll show you how to navigate your Mac via the command line, tell you where you can learn more, and then introduce you to a few of the uses of Unix.

GETTING STARTED

To access the command line, double-click Terminal, which is in Utilities in Mac OS X's Applications folder. Terminal will present you with a prompt, which is an invitation for you to type a command. The prompt will begin with [localhost:~], because localhost is the name of your Mac and you enter the command-line in your home directory (~), which is another name for your folder within your Mac's Users folder. The rest of the prompt will consist of your username and the % sign.

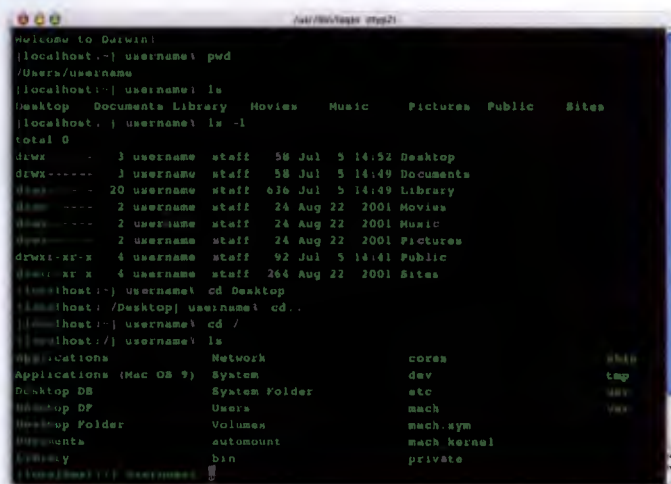
Type your first command: `pwd`. This the print working directory command, where print in Unix simply means output, whether to a printer, to the screen, or to the input stream of another program. Terminal will display `/Users/your_username`, making it perfectly clear that you're in your home directory.

At the next prompt, type `ls`, which is the list directory contents command. You'll see the folders and files that are in your home directory. Now type `ls -l`. (That's dash `l`, not dash `o`.) The `-l` flag tells the `ls` command that you want to view detailed information about every item in the list. Terminal will display each item on its own line, and provide nine columns of information about each item.

The first column will show whether the item is a directory (the first character is a `d`) or a file (the first character is a `-`). This column also shows if the file's owner can read the file (`r` or `-`), write to the file (`w` or `-`) or execute the file as a script or program (`x` or `-`). The remainder of this column shows whether other members of the owner's group can read, write or execute the file, and whether anyone else can.

The third and fourth columns show which of this computer's users owns this file, and to which group that user belongs. At the next prompt, type

`cd Desktop`



```
welcome to Darwin!
[localhost:~] username% pwd
/Users/username
[localhost:~] username% ls
Desktop  Documents  Library  Movies  Music  Pictures  Public  Sites
[localhost:~] username% ls -l
total 0
drwx----- 3 username staff 58 Jul 5 14:52 Desktop
drwx----- 3 username staff 58 Jul 5 14:49 Documents
drwx----- 20 username staff 636 Jul 5 14:49 Library
drwx----- 2 username staff 24 Aug 22 2001 Movies
drwx----- 2 username staff 24 Aug 22 2001 Music
drwx----- 2 username staff 24 Aug 22 2001 Pictures
drwxr-xr-x 4 username staff 92 Jul 5 14:41 Public
drwxr-xr-x 4 username staff 264 Aug 22 2001 Sites
[localhost:~] username% cd Desktop
[localhost:~/Desktop] username% cd ..
[localhost:~] username% cd /
[localhost:/] username% ls
Applications  Network  coreia  shlib
Applications (Mac OS 9)  System  dev  top
Desktop DB  System Folder  etc  var
Desktop DP  Users  mach  var
Desktop Folder  Volumes  mach.sym
Mountains  automount  mach kernel
Library  bin  private
[localhost:/] username% 
```

View and move through your Mac's directories using the `pwd`, `ls` and `cd` commands.

You've already seen that Desktop is a directory within your home directory. The `cd` (change directory) command will move you there.

Your prompt will now start with `[localhost:~/Desktop]`, reminding you that you're in the Desktop directory. Type `cd..` to move from your current directory to the directory that contains it — you're home directory.

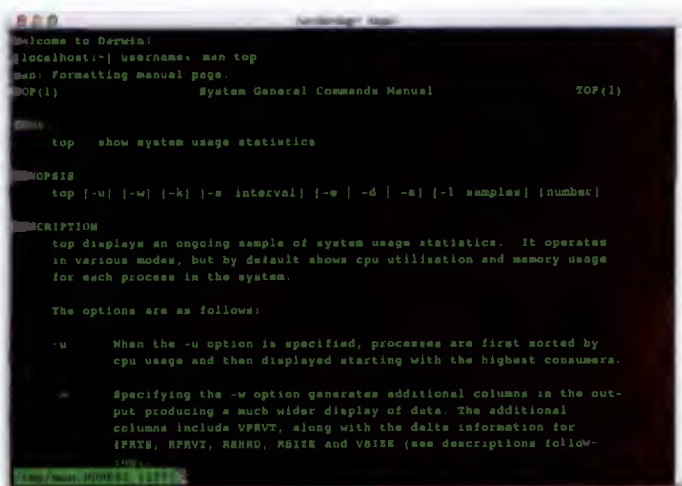
Finally, type `cd /` to go to the root level of your hard disk. The prompt changes to `[localhost:/]`, indicating your new location. If you type `ls` now, you'll see the directories at the root of your hard disk, including such hidden Unix directories as `bin` and `var`. You now know how to navigate via the command line.

LEARNING MORE

In the preceding paragraphs, you used just three commands — `pwd`, `ls` and `cd` — to move around your Mac. But you can use hundreds of commands, and many of them accept dozens of flags that modify their behaviour.

To learn how to use a particular Unix command, you should use the man pages. For example, type `man top` to learn how to use the `top` command, which shows the system resources that your programs are using, such as the amount of virtual memory they've claimed in megabytes.

The synopsis line in `top`'s man page should read: `top [-u] [-w] [-k] [-s interval] [-e] [-d] [-a] [-l samples] [number]`. This tells you that you can modify the `top` command using any combination of the `-u`, `-w`, `-k`, `-s` and `-l` flags, but you cannot use more than one of the `-e`, `-d` and `-a` flags. It also shows that if you choose to use the `-s` flag, you must follow it with an interval (seconds), and you must specify the number of samples if you



Using the man pages to learn about the top command.

use the `-l` flag. Last, it shows that you do not need to use a flag to specify the number of processes that `top` will display.

Press the return key to read more of `top`'s man page, including a full explanation of each flag. Press the space bar to scroll down page-by-page. Press `ctrl, C` to exit the man page and return to the prompt.

For a gentler introduction to Unix for Mac users, try Griffman's Terminal Basics (<http://homepage.mac.com/rgriff/index.html>) and Mac OS X.org's Command Line Interface Tutorial for Newbies (<http://macosx.org/clitutorial.html>). For more detailed information, check out the Mac Developer Center (<http://macdevcenter.com>), Stepwise (www.stepwise.com), and Dave Taylor and Jerry Peek's *Learning Unix for Mac OS X* (O'Reilly, ISBN 0596003420).

DYNAMIC WEB SITES

Mac OS X comes with a built-in Web server, called Apache. To start it, just click the Start button in the Web Sharing section of the Sharing panel in System Preferences. Point your Web browser at <http://127.0.0.1/> and you should see a Web page that welcomes you to using the Apache Web server. You're reading an HTML file that's sitting in the Documents folder in WebServer in the Library folder at the root level of your hard disk. Apache will automatically publish any HTML files that you place there.

One of the great things about Apache is that it can use languages such as Perl and PHP to create Web pages that change in response to user input or the contents of a database. But, you guessed it: using either technology requires a trip to the command line.

USING PERL

Apple includes two Perl scripts for Apache in the CGI-Executables folder in WebServer in the Library folder at the root level of your hard disk. The Web addresses for these two scripts are <http://127.0.0.1/cgi-bin/printenv> and <http://127.0.0.1/cgi-bin/test-cgi>, but if you try accessing them you will get a very blunt warning: "Forbidden".

It's not that you are not permitted to access these Perl

scripts. In fact, you can drag them on to TextEdit to read them, which will provide you with an excellent introduction to Perl scripting. On the contrary, the problem is that no one is permitted to execute these text files as scripts. We will fix this using the command line. First, type

```
cd /Library/WebServer/CGI-Executables/
```

to move to the directory that houses the Perl scripts. Then type `ls -l` to view information about every script in this directory. You'll see that both scripts are marked `-rw-rw-r--`. There's no `x` here, because neither the owner (root) nor anyone else may execute this script. To change this, type

```
sudo chmod +x *
```

then give your password when prompted. Now point your Web browser at <http://127.0.0.1/cgi-bin/printenv>. You'll see a Web page that the Perl script called `printenv` created on the fly after it collected data about your Web server and Web browser. To prove to yourself that the script is building the Web page on the fly, view it with two different Web browsers and note the differences in the `HTTP_USER_AGENT` line. Here's how it works:

Unix essentials

Use the man pages to learn more about these ten handy Unix commands.

rm, mkdir, rmdir

Delete a file, or make or delete a directory

grep

Search for any text string or "regular expression" within a file

nice

Tell Mac OS X to allocate more processor time to your most valuable programs

fsck

Check your file system for errors, and repair any damage

cron

Tell your Mac to automatically execute any Unix command according to a schedule of your choosing

ipfw

Enable and configure your Mac's built-in firewall to protect against hackers

curl

Transfer files to and from a remote server

telnet

Access one computer's command line via another's


```

Welcome to Darwin!
[localhost:~] username cd /Library/WebServer/CGI-Executables
[localhost:/Library/WebServer/CGI-Executables] username ls -l
total 24
-rw-r--r--  1 root  admin  5398 May  3 01:32 printenv
-rw-r--r--  1 root  admin   757 May  3 01:31 test.cgi
[localhost:/Library/WebServer/CGI-Executables] username sudo chmod +x *
[localhost:/Library/WebServer/CGI-Executables] username ls -l
total 24
-rwxr-xr-x  1 root  admin  5398 May  3 01:32 printenv
-rwxr-xr-x  1 root  admin   757 May  3 01:31 test.cgi
[localhost:/Library/WebServer/CGI-Executables] username

```

One of the two Perl scripts—
`printenv -- executable`.

Typing `sudo` temporarily gives you root user abilities. You need these abilities to modify this file because the root user owns this file, and only the root user and other users in the admin group are permitted to write (change) this file. Warning: don't use `sudo` lightly. The root user can cause enormous damage, through malice or inexperience.

The `chmod` command changes who may do what with a file or files. We typed `+x` to allow every user to execute the file and `*` to tell `chmod` to make this change to every file in the current directory. Type `ls -l` again. You will see that every file in the directory will now read `-rwxr-xr-x`, meaning that anyone may execute the file. We could have typed the name of a file instead of `*` to change just one file.

To browse and download free Perl scripts for your Web server that can do everything from processing incoming email to adding a search box to your site, visit the Comprehensive Perl Archive Network (<http://cpan.org>). To learn more about using Perl to create dynamic Web sites, try CGI Made Really Easy (<http://jmarshall.com/easy/cgi>). To learn more about using Perl — which has many uses other than Web scripting — try O'Reilly's Perl site (<http://perl.com>).

USING PHP

To start using PHP, you'll have to modify Apache's preferences file, which is called `httpd.conf` and lives in the `/httpd/` directory in the invisible `/etc/` directory at the root level of your hard disk. These are standard techniques that you can use to edit the preferences file for almost any Unix application.

First, type
`sudo cp /etc/httpd/httpd.conf /etc/httpd/httpd_backup.conf`

to create a copy of this file in case you make an error. Now, type
`sudo pico /etc/httpd/httpd.conf`

to open the file in the Unix text editor called Pico.

Type `ctrl-W` to access Pico's Where Is command, then type `php` and press return to search for the first instance of `php`. You'll come to a line that begins with `#LoadModule php4_module`. The `#` tells Apache to ignore this line, which would otherwise load Apache's PHP module. Press the left arrow key until the cursor is to the right of the `#` and then press the delete key once to remove it. Now, use the Where Is command to search for the next line containing `php` and remove the `#` from the start of that line too. Press `ctrl-O` to write out (save) the file, press return to agree to the file's default name and location (`/etc/httpd/httpd.conf`), and then press `ctrl-X` to exit Pico.

Stop and restart your Web server using the Sharing panel in System Preferences. PHP is now enabled. To test this PHP support, let's create our first PHP script. Open TextEdit in your Applications folder, then click the Plain Text radio button in

the New Document Format section of TextEdit's Preferences dialogue box. Now, create a new document and type this line:
`<?php phpinfo(); ?>`

Save the file as `info.php` in the Documents folder in WebServer in the Library folder at the root level of your hard disk. Now point your Web browser at <http://127.0.0.1/info.php>. You should see a dynamically generated Web page that reports on how PHP is configured on your Mac.

To learn how to create your own database-driven Web site using PHP and MySQL, start by running Marc Liyanage's MySQL 3.x installer for Mac OS X (<http://www.entropy.ch/software/macosex/mysql/>), carefully following the instructions on his Web site. Then, download the first four chapters of Kevin Yank's *Build Your Own Database Driven Website Using PHP & MySQL* (<http://sitepoint.com/books>), and follow every step other than those related to installing PHP and MySQL.

To learn more about PHP, visit the PHP Web site (<http://php.net>). To download and reuse entire shopfronts, chatboards and content-managements systems that were built using PHP and MySQL, visit the Hot Scripts archive (<http://hotscripts.com/PHP>).

SHELL SCRIPTING

Shell scripts can link hundreds of commands, variables and conditional logic to create powerful new programs, but to get you started we'll create a one-command script that eliminates a common annoyance.

The problem is that by default, Mac OS X places an alias on its desktop that points to the Mac OS 9 desktop file, so Mac OS X users can find the files that they left on their desktop while working in Mac OS 9. If users delete this alias when tidying their desktop, they might later wish they hadn't. The Mac OS 9 desktop is a hidden directory, which prevents

Install Unix software

There's a whole universe of Unix software that can be compiled and executed on Mac OS X. However, compiling a program for Mac OS X is not a task for the faint-hearted, especially if the authors of the Unix program had never imagined that their software might eventually be used on a Mac. Luckily for the rest of us, a team of expert Mac OS X users have stepped into the breach with Fink (fink.sourceforge.net), a program that makes installing Unix software on Mac OS X a little less complicated. While Fink is a step forward, it's certainly not a snap to use. Two resources that will help novices to use Fink are Griffman's Solution Guide #1 (<http://homepage.mac.com/rgriff/index.html>), which shows how to install Fink, and Fink Commander (<http://finkcommander.sourceforge.net>), which enables you to use Fink without the command line.

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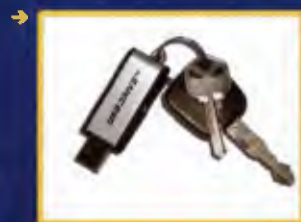
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Script Menu enables you to run shell scripts, Perl scripts and compiled AppleScripts from a convenient menu.

you from recreating the alias using the Finder's Make Alias command.

The solution: Create a shell script that recreates this alias. Before we create the shell script, let's recreate the alias

at the command line. Start by deleting the Desktop (Mac OS 9) alias if it's still on your Mac OS X desktop. Now, type the following at the command line:

```
ln -s /"Desktop Folder" ~/Desktop/"Desktop (Mac OS 9)"
```

Click on your Mac OS X desktop and you'll see that you've recreated the alias. The make links command with the create a symbolic link flag (`ln -s`) has created a new folder within your Desktop directory in your Mac OS X home directory (`~/Desktop/"Desktop (Mac OS 9)"`), and it has made this folder an alias (a symbolic link in the language of Unix) to your invisible Mac OS 9 desktop folder, which is stored at the root level of your hard disk (`/"Desktop Folder"`).

Now, let's create a shell script that does the same job. Type the following three lines at the command line, then press `ctrl-C` to end the `cat` process, which will save what you type as a file:

```
cat > desktopalias
```

```
#!/bin/csh
```

```
ln -s /"Desktop Folder" ~/Desktop/"Desktop (Mac OS 9)"
```

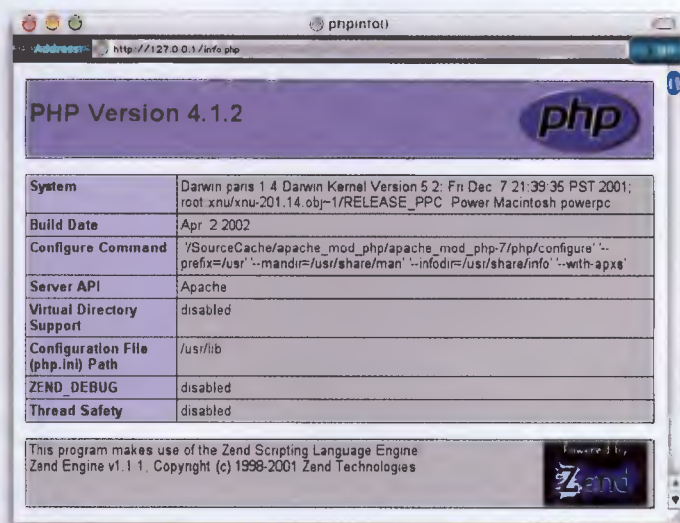
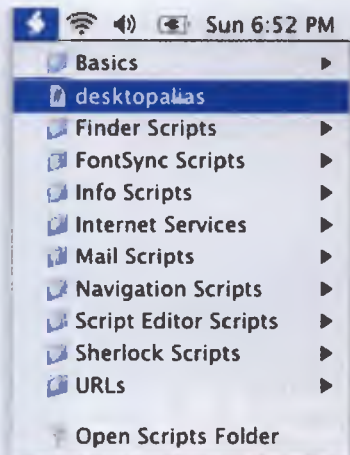
The second line, `#!/bin/csh`, is called the shebang line. It tells your computer to use the C shell to execute the script. The third line is the command you tested earlier — this is the command our script will execute. The first line, `cat > desktopalias`, tells the command line to create a file called `desktopalias` in your current working directory (the home directory), and to fill it with everything you type.

To turn your text file into an executable script, type `chmod +x desktopalias`

To move this script to the folder where the root user keeps executable commands, type `sudo mv desktopalias /usr/bin`

and give your password when prompted. Now, whenever you type `desktopalias` at the command line, you will execute this script and recreate the alias. If you don't want to have to return to the Terminal each time you need to execute this script, follow these steps:

Download Apple's Script Menu (<http://apple.com/>



We created this Web page with a one-line PHP script after using the command line to switch on Apache's PHP support.

`applescript/macosex/script_menu`), which requires Mac OS 10.1 or later. Put it somewhere for safekeeping, and then install it by dragging it to your menu bar. Script Menu enables you to launch shell scripts, Perl scripts and compiled AppleScripts from a convenient pop-up menu in the menu bar. Next, copy `desktopalias` to where it will be seen by Script Menu by typing:

```
sudo cp /usr/bin/desktopalias /Library/Scripts
```

at the command line and giving your password. You can now create the Desktop (Mac OS 9) at any time by selecting `desktopalias` from the Script Menu icon in the menu bar. **ETC**

Terminal tips

Typing commands in the terminal can be a real pain. Here are three tips to save your ten thumbs from too much typing.

USE THE COMMAND HISTORY

If you want to re-enter a recently typed command, press the up arrow key until that command appears, and then press the return key to enter it.

ENABLE OPTION-CLICKING

If you need to type anywhere in Terminal other than at the prompt, open Terminal's preferences, go to the Emulation panel, and then enable the Option Click To Position Cursor option. Now, you can option-click anywhere in Terminal to move your cursor to that point.

USE THE ALIAS COMMAND

The `alias` command in Unix allows you to create a short version of a command that you can type instead of the long version. For example, if you find yourself repeatedly typing `sudo pico /etc/httpd/httpd.conf` to edit Apache's preferences file, try typing `alias eap sudo pico /etc/httpd/httpd.conf`. From then on, you will be able to simply type `eap` to open Apache's preferences in Pico.



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You can save time by allowing PHP and MySQL to take care of your site's content — and it's free of charge! Andrew Phillips guides you through.

Traditional page-updating via FTP or Telnet can be a tedious task, especially if you update your site daily. Problems can also arise if other authorised users wish to add or edit pages. A cost-effective, powerful solution is to use PHP and MySQL to manage your content. With this popular combination of server-side scripting language and lightning fast database, it's possible to do almost anything a commercial app can, except it's free.

This workshop will concentrate on designing a system which can add and display content via dynamic pages, and also enable administrators to edit or delete the page after it's been submitted. And if this all sounds a little daunting, don't worry.

You'll be in luck if your Web host supports both PHP and MySQL. Many Australian Web hosts lean more towards Microsoft's ASP rather than its open-source equivalent PHP, so make sure you check this out before going any further. For a quick listing of Australian Web hosts that support PHP and MySQL, point your browser at www.hosts.php.net/search.php, change the country to Australia, check the MySQL box and click Next.

Included on this month's APC cover CD is a Zip file containing the source code to the example program. There are three parts to this program: `display.php`, which finds the appropriate database record and outputs it to the screen; `admin.php`, which adds/edits/deletes database entries; and `config.php`, a simple script that allows for easy changes in certain variables (i.e., username/password).

The content system works by storing the data submitted by a user (through the `admin.php` Web-form) into a MySQL database. The data then gets stamped with an ID number and date automatically, for easy indexing.

The `display.php` script calls on MySQL to find the last 20 records entered into the database, and displays them to the Web site visitors in descending order. What makes this system so robust is that since the content is being stored on a database instead of a static Web page, it's possible to do some much more interesting things with the data.

The possibilities include adding search capabilities, allowing users to rate the content, and even personalise the Web site's front page to better suit the user's taste. Once you have your content in a database, it opens up another world of functionality, for both you and the visitors.

First, create the database table you'll be using for your Web

This Web form allows for news stories to be added to the database quickly and easily.

site. Your Web host should provide you with the appropriate information needed to log into its MySQL server. Bring up a Telnet session (usually `c:\windows\telnet.exe`), connect to the Web host, and issue the following command:
`mysql -u "your_user_name" -p "your_database"` (without quotes)

If your Web host has not created a database for you, ask them to do so now. If everything has been configured properly you should then be prompted for the password. Enter it and you will be greeted with the MySQL shell:
`mysql>`

It may not be pretty, but when you need to perform database maintenance such as backups, this prompt will be your best friend. This is a good opportunity to create the MySQL table which is needed for the example program. This process only needs to be performed once. Before creating this table, have a think about what kind of data your looking to store, and what you may need in the future.

MySQL tables will store your content, along with storing the columns which organise the information into more useful groups. This workshop article will be utilising a MySQL database to store news stories which can be viewed by your Web site visitors, so you'll need to create some fields usually associated with news stories. At the MySQL prompt, type in:
`mysql> CREATE TABLE news (headline VARCHAR(100), author`

► Source code from the admin.php script.

```

VARCHAR(50), id int(5) unsigned zerofill NOT NULL
-> auto_increment, time timestamp(14), news_story TEXT,
-> PRIMARY KEY (id));

```

This command creates the following columns: headline, author, id, time, and news_story. The command is separated by commas, which specify the name of the column and what data it will hold. Most common is field_name VARCHAR(x), which tells MySQL to create the column field_name and allow a number of characters to be inserted (up to 255).

To input larger amounts of text data use the TEXT identifier instead, which is what the example program will be using to store the actual news story. The id identifier creates a column called id, and will increase its value by one every time a story is submitted. So your first story will have the id of 00001, second story of 00002, etc.. So you know when the story was submitted, the time column gets the current time and date from the server and records it.

After the table has been created, decompress the Zip file (/workshop/phpmanager.zip) from this month's cover CD, and open the file admin.php with your favourite text editor. Take a moment to check the code. The file has three main functions: add entry, edit entry, and delete entry. It will also display a basic administration menu if no option has been selected.

So how can one PHP file have so many different functions? If you're familiar with C++, you'll know how if statements work. To those who aren't, if statements work by checking if a certain condition is present, and if it is, it will then perform the commands within the brackets. For example:

```

if ($today==monday) {

    echo "Today is monday";

} else {

    echo "Today is not monday";

}

```

These type of if statements are used throughout the admin.php script to perform several different operations using the one file. PHP can also be called in and out of HTML code as many times as you like, via its start and end tags: <? and ?>. For example:

```

<HTML>
<HEAD>
<TITLE><? echo "PHP Content Manager"; ?></TITLE>
</HEAD>

```

```

<? else if ($option==submit_add) {
    // This part of the code gets executed once
    // the user has clicked on "Submit" from
    // the "Add Entry" section
    if (!$my_headline) { echo "Error - No headline entered!"; exit(); }
    if (!$my_author) { echo "Error - No author entered!"; exit(); }
    if (!$my_story) { echo "Error - No story entered!"; exit(); }

    $my_story = ereg_replace("\n", "<br>", $my_story);
    $my_story = addslashes($my_story);
    $my_headline = addslashes($my_headline);
    $my_author = addslashes($my_author);

    mysql_query ("INSERT INTO news (headline, news_story, author, id, time)
        VALUES ('$my_headline', '$my_story', '$my_author', 00000, NULL)
        ") or die("Error - Unable to insert news story into database!");

    echo "News story successfully entered into database!";

} else if ($option==select_story) {
    // This code displays the last 50 headlines
    // and allows the user to choose an appropriate
    // news story to edit or delete
    ?>

    <form action="?" echo PHP_SELF."?option=" . $method." method="POST"><br>
    <FONT SIZE="2">Edit/Delete News Story</FONT></P></DIV><DIV ALIGN="LEFT">
    <FONT FACE="Arial, Helvetica, sans-serif"><br></FONT></DIV><TABLE

```

Now that you are familiar with some basic PHP syntax, let's get into something a little more advanced. As you may already know, PHP is great when it comes to databases. In this next example, PHP is called upon to open up a MySQL connection, and insert some records into the database. This can be done using only a few lines of code:

```

// Open up a connection with MySQL
$connect = mysql_connect($host, $user, $pass)
    or die ("Unable to connect!");

```

```

// Select the database to be used
mysql_select_db($db)
    or die ("Unable to select database!");

```

```

// Insert information into the database
mysql_query ("INSERT INTO news (headline, news_story, author,
id, time) VALUES ('$my_headline', '$my_story', '$my_author',
00000, NULL) ") or die ("Unable to insert news story into
database!");

```

The last part of the example is the most important. This takes the information entered into the Web form and inserts it into the news table you created earlier, via a single MySQL query. \$my_headline, \$my_story, and \$my_author are variables which have been already entered by the user submitting the news story via the Web page. The other fields (id and timestamp) are assigned values automatically by MySQL.

Now would be a good time to try out adding a news story to the database, and trying to run PHP script on the server.

Open config.php with your text editor and change the variables to suit your server settings. Don't forget that the

SQL queries

When sending commands to MySQL, you need to use the SQL (Structured Query Language). This language is the most commonly used language in these kind of access databases. It is also quite easy to get to know, since it uses an English-friendly approach to manipulating databases. For example, searching the news table for any records with "virginia" in the headline column is quite easy: `SELECT * FROM news WHERE headline LIKE '%virginia%';`

The finished product — a simple content manager.

default \$user, \$pass, \$host and \$db values need to be changed in order for PHP to connect to the MySQL server correctly. Once that's saved, upload the config.php and admin.php files to your Web server, and set the permissions as world-readable and executable (you can change this later).

Next, open up your Web browser and enter the URL to the admin.php file. If you set up the appropriate file permissions and edited config.php you should be looking at the admin menu of the content manager. Using the browser, add a few example news stories into the database.

READ ALL ABOUT IT

Now that the MySQL table contains some records, it's time to put them to use and write a script which displays the news stories (display.php). In this situation, MySQL will be called on to find the last 20 records and sort them in descending order based on the time the record was added. Here's how it's done:

```
// Include the config file
// and exit PHP if not found
require("config.php");

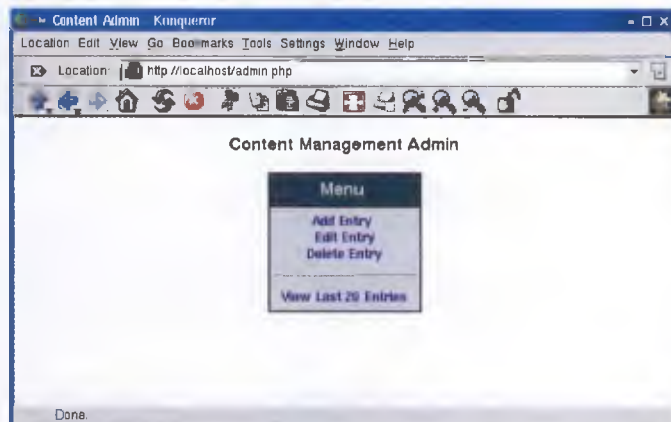
// Connect to MySQL server
$connect = mysql_connect($host, $user, $pass)
    or die ("Unable to connect to MySQL server!");

// Select the database
mysql_select_db($db)
    or die ("Unable to select the database!");

// Find the first 10 news items and
// display them in descending order
$query = "SELECT id, author, UNIX_TIMESTAMP(time),
            headline, news_story FROM news ORDER BY
            time DESC LIMIT 10";

$result = mysql_query($query) or die (mysql_error());

// If records are found, print them
// out until no records are left
if (mysql_num_rows($result) > 0)
{
    while($row = mysql_fetch_array($result))
    {
        <p><b>?echo $row["headline"]. "</b>";
        echo "<font size=2> - ".$row["author"]. " - ";
        echo date("F j, Y", $row["UNIX_TIMESTAMP(time)"]);
        echo "<br><br>";
        echo stripslashes($row["news_story"]);
    }
}
```



```
echo "</font></p><hr>";
}
}

// If no news stories are found
else {
    echo "<b>No news stories found!</b>";
}

// Close the database connection
mysql_close($connect);
```

It's easy to incorporate the news story database into an average Web site design. Simply cut and paste the display.php code into a blank section of the template where the news should be displayed and rename the file with a .php extension.

The final step is to upload the display.php file to your Web server. Make sure you set the file permissions correctly so it's world-readable and executable. For added security, don't forget to place the admin.php file in a password-protected directory hidden from any malicious users. If you do put admin.php in another directory, be sure to edit accordingly the required ("config.php") command at the start of the admin.php file, as the path to the config file would then be different.

And you can modify the existing PHP code to produce an article database, product catalog or even a family photo album.

Check out the following Web sites: www.phpbuilder.com, www.sitepoint.com, www.devshed.com, and of course www.php.net and www.mysql.com. **FILE**

phpMyAdmin v2.3

Included on this month's cover CD is an extremely useful program called phpMyAdmin v2.3, which makes database management easy. Instead of using the command line, phpMyAdmin uses Web pages to create, edit, and delete databases and their tables. It can also import and export databases, useful when backing up a Web site.

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Beat the RAM cram!



Is your Palm handheld overloaded with applets, ebooks and games? Adam Yap shows how to uncover about 50% more storage space.

Most Palm users have discovered one of the basic truths about handhelds: there's never ever enough memory. No matter how much RAM you've got in your hand, it's quickly jam-packed with a bunch of cool and suddenly indispensable programs.

And while expansion cards such as SD and Memory Stick let you carry more stuff around, not all apps are card-compatible — and those which can access data stored on memory cards suffer from slow loading times.

Let's face it: you just can't beat on-board memory. That's why successive models of PalmOS handhelds raised the roof from the first 128KB Pilot 1000 to a generous 8MB in Palm's entry-level m105 and a whopping 16MB in the flagships from Palm, Handspring and Sony. What you may not know is that sitting inside most Palms is a secret stash of unused memory just waiting to be filled.

THANKS FOR THE MEMORY

So where is your handheld's hidden cache? It's locked away in the ROM chip that's used to store the PalmOS and built-in applications. But there's some headroom left over: for example, a Palm V sports a 2MB ROM chip, but only 1.2MB is occupied by the OS and apps. That leaves some 800Kbit of tantalizingly empty space — almost half as much as the Palm V has on its own!

"That's all well and good but ROM is Read-Only Memory, so there's no way to write data into that extra space," you may say. Luckily, Palm chose not to employ pure ROM in most of their handhelds. Instead, the designers opted for Flash ROM which — with the right software — can be written to, similar to the way you'd update a motherboard's BIOS.

Due to the higher relative price of Flash ROM, several handhelds employ a true and very boring read-only ROM to keep costs down. These include the original Pilot, PalmPilot and Palm Professional series, the Palm IIIe and the budget-minded m100 family (from the base model m100 through to the m130), and all Handspring Visor units. With these, you're stuck with the standard RAM.

Palm's intent was to future-proof its handheld by allowing customers to easily upgrade the PalmOS, which is where all that headroom would come in quite handy, because operating systems tend to grow bigger with each successive release.

Of course, how you use that extra space in ROM is up to you.



▶ JackFlash lets you easily move applications into Flash ROM or back to RAM.

So here's the trick: instead of loading all those neat third-party applications, games and e-books into your Palm's regular memory (which is battery-backed RAM), why not stick some of them "upstairs" into the Flash ROM? They'll still be just a tap away on the main menu screen, but by loading them into Flash ROM you'll free up space "downstairs" for more apps.

How much free Flash ROM is in your Palm depends on what model handheld you've got, as well as which version of the PalmOS is installed. In the case of a 2MB Palm V running PalmOS 3.1, you can squeeze out a total of 2.8MB of memory — the conventional 2MB plus the 800KB of left-over Flash ROM.

And with later models, such as the m500 series sporting a 4MB Flash ROM chip, the amount of spare flash memory available is even greater.

Loading apps into Flash doesn't stop you from upgrading to a later version of the PalmOS in the future, because it's easy to move programs back down into regular memory and reclaim all that ROM room. Even so, Palm has kept true to its "more is less" mantra — the current PalmOS 4.1 on an m505 weighs in at 2.4MB, leaving you 1.6MB for loading third-party applets.

QUICK AS A FLASH

To move apps into and out of Flash ROM you'll need to add some special "flash" utilities to your Palm toolkit. The two most popular are FlashPro (US\$19.95 from Handera, www.handera.com) and JackFlash (US\$19.95 from Brayder Technologies, www.brayder.com).

My preference is JackFlash. The interface is clean, easy to

► Viewing by categories keeps track of what's loaded where.

understand and lets you choose category views such as Apps in Flash, Apps in RAM, DBs in RAM and so on. It's friendlier to Palm "hacks" than JackFlash, and also faster when it comes to moving apps between RAM and Flash ROM. And JackFlash is frequently updated to keep pace with new PalmOS handhelds.

It is very easy to move programs into Flash ROM. First, install files on your Palm in the normal way via the Install Tool and a HotSync session. Then run the flash utility, choose the app to move, tap a button, wait a few seconds and the job's done.

You can load a few of the larger apps into ROM, or populate it with a score of small but handy programs. There's an added bonus in using Flash ROM — even if you need to do a hard reset of your Palm (which erases everything in RAM), the apps sitting in the Flash ROM remain safe and ready to use.

There are some limitations to using Flash ROM. Most Palm applications don't know how to write data into the ROM, so you won't be able to use it as a storage area for files that can be edited in any way. For example, you can safely move a spreadsheet into ROM, but the worksheets themselves must stay in RAM. This is because applications are almost always read only; you never change the application code in day-to-day use, only the data that the application uses.

Since it's sometimes confusing to work out exactly what files are written to, as a general rule I move only PRC files (self-contained applications, including read-only ebooks) into the ROM area; I leave data files (with the PDB extension) in RAM.

But not all PRCs are Flash friendly — so spend some time checking the Web pages of your favourite apps, dive into Palm newsgroups such as **alt.comp.sys.palmtops.pilot** and **comp.sys.palmtops.pilot**, and be prepared for a little trial and error of your own.

STREAMLINING THE PALM OS

But what if that extra 800KB of memory just isn't enough? What if it only whets your appetite for more? No problem. You can gain substantially more memory by hacking into the PalmOS itself.

For instance, all m500-series Palms sold outside the US come with multiple languages burned into the Flash ROM. This is so the unit can be configured for languages other than English. These models are sometimes called EFIGS, which is a reference to the ROM-based language modules of English, French, Italian, German and Spanish. If you're a typical Australian user, you can safely remove the FIGS language modules, leaving only English and thus winning a whopping 1.28MB in the process!

To delete language packs you'll need another Brayder flash tool named JackSprat 1.0 (about \$14). At the time of



writing, version 2.0 of JackSprat was in beta test and packed another amazing ability for the memory addict: removing Palm's bundled apps and even components of PalmOS from the ROM. For example, if you never use the Palm's Mail applet, why not delete it and pick up a handy 65KB? Maybe you've chosen a more powerful third-party app over Palm's own offerings, such as the mighty Datebk5 — ditching the PalmOS Datebook recovers 110KB.

Sony Clie owners can remove the Clie Demo and GMovie, and unused OS functions like Network Support or Modem Support. Note also that JackSprat only removes code from the ROM — you'll still need JackFlash to load applications into the newly-vacated memory.

ROLL YOUR OWN ROM

An alternative way to make the most of Flash ROM is to rebuild it from the ground up. You could rely on Palm-based flash

Flash facts and figures

How much free Flash ROM can you get from your Palm? It depends on the model and the version of PalmOS you're running.

Handheld	PalmOS version	Free Flash ROM
Palm III	3.0	832K
Palm IIIx, V	3.1	832K
Palm III, IIIx, V, Vx	3.3	704K
Palm III, IIIc, IIIx, IIIxe, V, Vx	3.5	576K
Clie N710C	3.5	704K
Palm m500, series *	4.0	448K
Clie S320	4.0	1216K
Palm III, IIIc, IIIx, IIIxe, V, Vx	4.1	384K
Palm m500 series *	4.1	1664K
Clie N760C	4.1	320K
Clie T615CG	4.1	320K

* Most m500-series Palms sold in Australia contain the multiple-language (EFIGS) OS core. Removing the non-English language modules with an EFIGS editor increases available Flash ROM to 1728Kb



▶ Loading third-party apps into Flash RAM frees up more memory.

utilities to move applications back and forth between RAM into ROM, or modify the ROM chip's contents in situ. But why not download an image of the ROM onto your PC, tailor it to your exact needs and then upload the new ROM image to your Palm as if it was an OS upgrade?

That's the approach taken by ROM-editing applications like Romeo (Linux freeware from <http://romeo.sourceforge.net>) and Chromed (\$9 from <http://euroclie.free.fr>).

The level of flexibility allowed is staggering — you can remove and replace practically any component of the PalmOS. It's not as simple or foolproof as using JackSprat (Chromed is the most user friendly and Romeo the least, but it is free!), and these types of programs are not as mature or time-proven as flash utilities.

You also lose the flexibility of moving applications easily

in and out of the ROM. If you upgrade to a new version of Datebk5, for instance, you might need to completely reflash your ROM instead of just swapping the one program.

So for most users I'd recommend sticking with with JackFlash or FlashPro. But if you want the ultimate in Flash ROM hacking, this is the only way to travel.

BUT IS IT SAFE?

If you think that writing to ROM is a bit unorthodox, you're right. You're about to hijack space that the manufacturer set aside for OS upgrades, and use it in ways it was never planned for. So what's the risk when you fiddle with the Flash ROM?

Utilities like JackFlash and FlashPro are impressively solid, with most problems coming from the programs being moved into ROM, especially if they try to write data to what they think is conventional memory. The results can range from a simple soft crash and "graceful exit" by the app itself, to an annoying but far-from-fatal soft reset. There is also a possible hard reset — which will wipe all the data from the Palm (except what's safe in Flash ROM).

Editing the ROM itself carries a far greater level of risk than simply moving applications into flash memory. It's the equivalent of performing open-heart surgery on your Palm, and if you botch the ROM editing or image upload you could end up with a Palm that's DOA.

The important thing to remember when evaluating ROM rewriting tools is that not all ROM is made equal. Flashable ROM can be divided into two parts: a small slice which acts like the boot code or BIOS, and a larger chunk that contains the

Speeding up HotSync

Spend less time getting that syncing feeling with these power tips.

The first time you drop your Palm into its desktop cradle, hit the HotSync button and watch it get into step with your PC's desktop diary software, it's all pretty cool to behold.

But soon it's just another speed bump in your day — especially if you're already running late for that appointment. Doubly so if you're pulling content from the Web through programs like AvantGo.

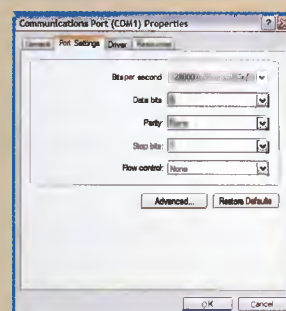
Here's how to turn the link-and-sync routine into a rapid 'drop, dock and go'. First, check the default HotSync speed on your Palm. Run Preferences, choose the Connection option, select Cradle/Cable and tap the Edit button. Check that the Connect to PC and Cradle/Cable entries are showing, then tap Details. Chances are that it's still on the factory setting of 57,600 bps.

This is to ensure maximum compatibility out of the box: it's safe, but oh-so-slow! Depending on which model Palm you're running, you can double the sync speed to 115,200 bps across a conventional serial or COM port, or redline it to a screaming 230,400 bps if you've got one of the more recent Palm handhelds with native USB support.

You'll also want to check the port speed on your desktop or notebook PC. This is accessible through the Windows Device Manager in the Control Panel's System applet. Scroll down to Ports, choose the COM port (assuming you sync via the serial port, not USB), double-click it to open the Properties box and click the Port Settings tab. This defaults to a safe but slow 9600 bps. Change it to match the top speed of your Palm (the maximum is 128,000 bps).

Finally, ensure that the HotSync Manager is also ready to roar along: right-click the HotSync icon in the Windows System Tray, choose Setup, click the Local tab and set the Speed rating to 'As Fast As Possible'. If you have problems during subsequent HotSync sessions, ranging from a refusal to start the sync session to an abrupt disconnect, try throttling back on the Palm's sync speed.

David Flynn



Increasing the COM port speed on your PC.

physical operating system. It's extremely inconvenient if you accidentally delete or overwrite the OS portion of the ROM, but you can still reinstall it. However, if you wipe the BIOS portion, your Palm could fail to start. And because this smaller portion also contains the tools to reinstall the image, you'll be stuck for good.

MO' MEMORY? HERE'S HOW ...

Just how much extra memory can you squeeze from your Palm? We set upon an innocent factory-fresh m505 to find out.

Although rated at 8MB of RAM, out of the box the m505 has only 7.7MB available — the rest is occupied with space needed by components of the operating system and some pre-loaded apps such as the graffiti game.

Curious to see how much of the m505's Flash ROM was available for our nefarious purposes, we installed JackFlash. The m505 contains a 2Mb ROM chip, of which it was revealed that 447KB is free under PalmOS 4.0.

Well, not for long! We installed three of our favourite programs: the AvantGo offline Web-channel reader (310KB), the hack manager X-Master (54KB) and the addictive game Vexed (64KB). Then, with the aid of JackFlash, we shifted them out of system RAM into Flash ROM. This bottomed out the Flash

ROM to 21KB but left plenty of room "downstairs". JackFlash also indicated that the m505 was an EFIGS model, so we added JackSprat. At 127KB JackSprat is much bigger than the nimble 61KB JackFlash, but you can remove JackSprat when you're finished with it, whereas you'll want to keep JackFlash on hand for further RAM-to-ROM shuffles.

JackSprat begins its memory mischief with a quick soft reset to temporarily clear the system of hacks. It also offers the safety net option to backup the ROM to your PC or an SD card (this is very much worth doing). That done, JackSprat slices into the ROM and removes all of the non-English languages, a process that took around four minutes and culminates in another soft reset to get things back on an even keel.

JackFlash promptly detected the newly available space and added it to the total amount of accessible Flash ROM. The result: a whopping 1.3MB free for the taking!

Pushing our Palm for all it was worth, we fired up the beta of JackSprat 2.0 and killed a selection of PalmOS apps which were not needed or for which we had our own favourite third-party replacements: the address book (64KB), date book (100KB), mail client (65KB), to do list (32KB) and the Welcome applet (59KB). This raised the flash ROM roof to 1.62MB, leaving ample room for monster apps like DateBk5 (557KB) and iSilo (308KB). 

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Life in the networking fast lane



Want to step up to 100Mbit fast networking?

Serdar Yegulalp shows you how to avoid the speed bumps in Windows 2000.

When it comes to networking there's one adage we all know and love. It's the one that says "the faster the better". Interestingly, 100Mbit speed — one of the most useful aspects of networking either in home or office environments — is also much under-exploited, especially if you're running Windows 2000.

Microsoft's former flagship OS for the corporate and power user puts plenty of kinks in the road to fast networking. Here's how to beat the beast and step out of the slow lane.

GET THE GEAR

Sure, speed is good, but there's more to the 10Mbit versus 100Mbit equation. For one, most 10Mbit networks only work in "half duplex" fashion: you can either send or receive, but not both at the same time. 100Mbit allows "full duplex" — simultaneous send and receive — which makes overall throughput substantially faster again. So what are you waiting for?

First, arm yourself with some 100Mbit kit. Most network adaptors or NICs made these days fully support both 10 and 100Mbit networking, so you may already be in luck. And with prices for a decent 10/100 network adaptor around the \$50 mark, you can upgrade from an older network adaptor, such as an ISA bus NIC on a system that has PCI slots, without breaking the bank.

You can pay a lot more for network adaptors, but many of these are designed to work with Windows 2000 servers rather than workstations, and have features specifically designed to accelerate server performance, such as QoS packet tagging or PCI bus offloading.

You should also look into a 100Mbps network switch, to string all the networked PCs together. Forget about hubs — they simply repeat anything that comes into one port to all the other ports, regardless of whether or not it's supposed to go there. This means that only one machine can use the hub at any given time, and everyone else has to wait.

Switches are far more sophisticated. A switch intelligently routes traffic between ports, a far more efficient method that's both faster and uses less overall bandwidth.

A five-port switch can run from under \$100 to around \$150, and some companies offer a network kit which combines two or more NICs with a small switch at a cheaper rate than the individual items.

Those bundles will also save you plenty of headaches. I've encountered dozens of frustrating incompatibilities between some varieties of NIC and some network switches.

Finally, ensure that you're running Category 5 (Cat 5) network cable. Cat 5 cable is designed and shielded in such a way as to carry signals with minimal degradation, and 100Mbit networking requires Cat 5 cabling (or better) to work reliably. The vast majority of network cabling sold today is Cat 5, but if you don't know what rating your current network cable has, it's usually printed on the cable itself.

DRIVERS MAKE A DIFFERENCE

Here's where Windows 2000 starts to get bad-tempered. The OS takes a stab at detecting which network card you're using, and usually installs a Microsoft-branded but vendor-written driver. Click the Driver tab in the NIC's Properties dialog, and the "Driver Provider" and "Digital Signer" entries will tell you where the driver is from.

If it's a driver from the repository sitting on the Windows 2000 CD, you'll see "Microsoft" for Driver Provider (even if it's a name-brand NIC) and "Microsoft Windows 2000 Publisher" for the signer. (This means that Microsoft has put the driver through its Windows Hardware Quality Labs testing program).

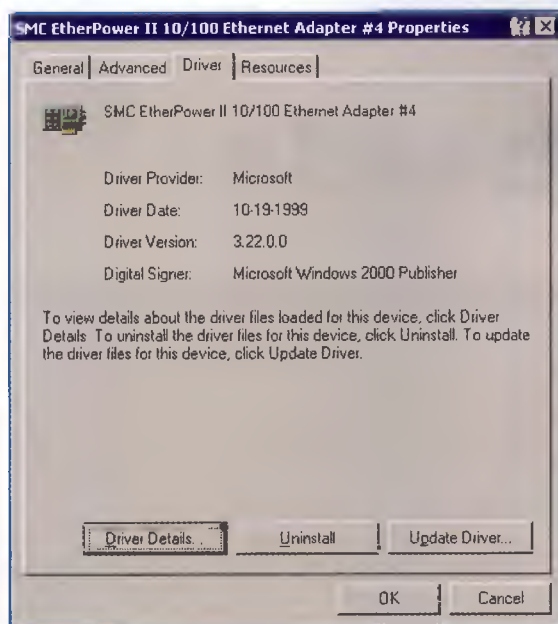
Sometimes a "good enough" detection job isn't good enough at all. The driver that gets installed may be a mere generic chipset driver, which is designed to run any card that uses the same chipset as the NIC in your machine. Windows 2000 uses this fall-back method to provide a working driver for cards that it doesn't have an exact match for. And while this will get the card working, it won't always fully support 100Mbit connectivity, or offer many equally important features.

Even relying on generic drivers can lead you astray. I've encountered many Intel network cards which Windows 2000 reports as a generic Intel chipset NIC when, in fact, they're a very specific model. Despite a generic driver installed, and even with properties that can be changed, the card simply refuses to work.

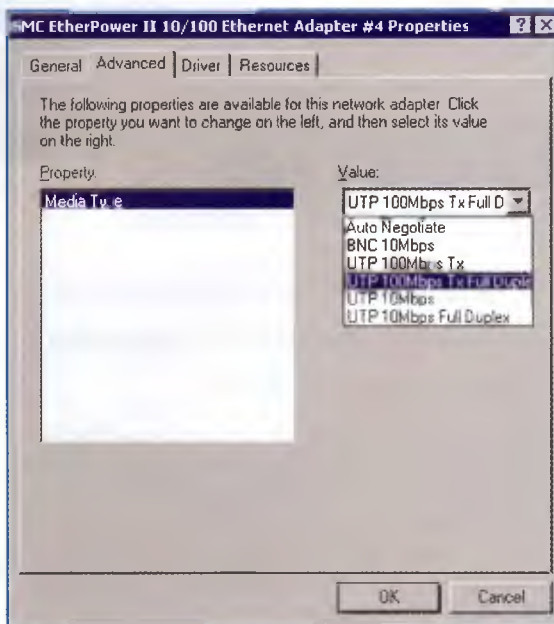
The way around this is to install the correct manufacturer-provided driver, usually by downloading it from their site. If you don't have network access when you install the card, load the driver that came with the NIC — it'll do until you can hit the Web and grab the most up-to-date driver. Better yet, plan ahead and download the latest drivers before you drop in the card.

Windows 2000's Windows Update facility will alert you as to when a new Microsoft-signed driver is available. Also be aware that while a manufacturer may provide a newer driver than the one Microsoft has certified, it may not be as stable.

The proper network drivers aren't much good without the



► A Microsoft-provided driver for a network card or NIC. This driver's been tested by Microsoft to guarantee that it works well — although a manufacturer-specific driver may have more features.



► Set your NIC to exclusively use 100 megabit full-duplex instead of autodetection. It'll be more reliable when dealing with other 100 megabit nodes.

proper settings, either. The "out of the box" settings for network drivers are designed to provide maximum compatibility: plug into any network environment and it works. However, for 100Mbit networks, there's some fine-tuning you can do to pep things up.

Call up the Properties page for your NIC and select the Advanced tab. Each NIC will have a completely different set of Advanced properties, but one of the few things that will almost always be consistent from card to card is the "Media Type" or "Network Type" setting. (On my Intel card it's called "Link Speed and Duplex").

Usually this is set to "Auto-detect", but if you know you're running nothing but 100Mbit networking, set it to 100 Mbps/ Full Duplex or whichever setting is closest to that. This forces the NIC to use nothing but 100Mbit, rather than trying to detect the network settings automatically.

Some NICs don't have great detection algorithms, or may spuriously drop the network connection and re-enable it when set to Auto-detect.

HELPFUL NETWORK HINTS

Try not to mix and match 10 and 100Mbit networking on the same network segment. There are switches that can intelligently handle 10 and 100Mbit clients without causing too much of a slowdown, but on the whole you'll be best off if you stay consistently at 100Mbit.

Switches often have an "upstream" or "uplink" port, which allows the switch to be plugged into another switch, in effect chaining two of them together. This is a good way to merge two network segments together, but you may experience performance degradation if you merge too many of them together. The best thing to do is to buy a switch that has the appropriate number of ports you need and populate that.

Some who set up 100Mbit networks experience very high rates of "network collisions". These occur when two machines

both try to use the network at exactly the same time. The switch can try to route the traffic, or if that isn't possible, it simply rejects both network requests at the same time (since they "collide"). This is often due to one of the NICs being off-brand and having a cheap network timing algorithm. It'll work well with others of its own brand, but badly with others of another brand.

Sometimes this is also due to a cheap switch, but it's often a lot easier to just replace an off-brand NIC than it is to replace the switch.

Windows 2000 itself can also be modified to compensate for heavy rates of 100Mbit network collisions, especially when you're copying files from one machine to the next. The way to do this is to modify the parameters for what's known as the interframe gap — the time the card waits before transmitting on the wire when the wire's released.

This parameter varies from card to card and may not be supported by some cards. The full details for this can be found at <http://support.microsoft.com/default.aspx?scid=kb;en-us;q169789>. 

Useful software

You can find these online and on this month's cover CDs.

For gauging network speed before and after your tinkering, few programs can beat AnalogX's NetStat Live, a marvellous and very spiffy-looking utility for graphing network throughput on any Windows machine. It's free from www.analogx.com/contents/download/network/ns1.htm.

For a little local packet sniffing to determine if everything is running okay on the new 100Mbit network, try NetworkActiv Sniffer 1.4.2.1 (www.networkactiv.com), a free network-analysis tool with detailed capture and playback capacity.

Genie in a bottle



True multi-region PC-DVD drives are rare to find. Joe Cassels shows that with some sneaky software, you can change that.

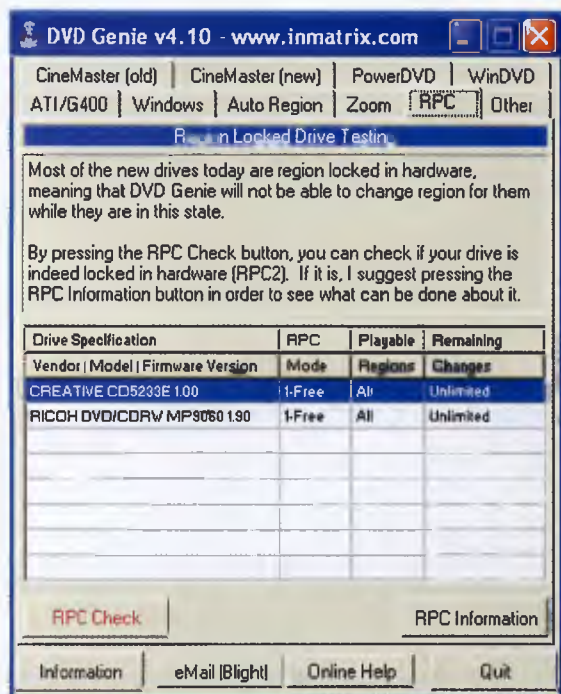
It's bad enough that Hollywood studios can force endless Steven Seagal films on us. But to divide the world into artificial "regions" that restrict DVD playback and exercise control over physical product distribution is pure evil!

Your PC's DVD drive won't help much — at least, not in its natural state. Most DVD drives are region-locked, only allowing you to change the DVD region a maximum of five times.

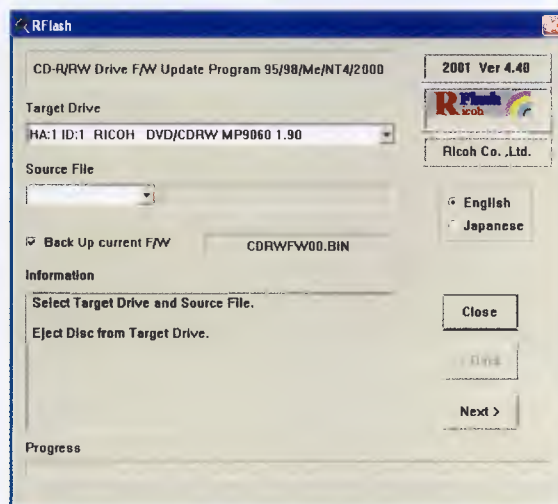
CHANGING THE REGION CODE

DVD Genie (included on this month's cover CD set) integrates with the major software DVD players and can automatically change the region code of your drive to match your disc. Installing DVD Genie is easy, although if you're running Windows 2000 or XP you'll also need to get the .DLL file `winaspi32.dll`, which you can download from www.inmatrix.com/files/winaspi32.zip. Extract it to the `Windows\System32` folder.

On its own, DVD Genie doesn't get around the five swap limit. To sort that out, you'll need to flash your drive's BIOS. This



► DVD Genie checks your drives for region locking. These have been successfully flashed.



► This flashing utility lets you back up your existing drive's BIOS — take advantage of it.

isn't as frightening as it sounds, but you will need to take some precautions. Firstly you need to know your drive's specification and if it is region locked (most are). DVD Genie takes care of this.

Launch DVD Genie and select the RPC tab. Click RPC Check, and you'll see all CD and DVD drives, along with their region status. If your drive is RPC2, it's locked and you'll need to flash it. Make a note of the drive details given here.

Your next port of call is the Firmware Page. It moves around, so you may need to use a search engine to find it, although it currently resides at www.firmware.fr.st. Browse for the type of drive (Combo, DVD-ROM etc.) and then look for an exact match for your drive. Don't even think about using a patch that isn't listed for your drive, because you'll ruin your hardware. Download and extract the patch if necessary. Carefully read any text document alongside the patch as many have special instructions (like needing to run under DOS). If the software allows you to back-up your drive's current BIOS, do so, as it could be a valuable lifeline should things go wrong.

APPLYING THE FLASH

Now it's time to apply the flash according to its instructions. If you run Windows XP and need to drop into DOS, you can get a DOS boot disk from www.bootdisk.com. Restart your computer if you need to and fire up DVD Genie. Go back to the RPC check and, if your flash worked, you should see your DVD drive reported as RPC1, all regions, unlimited changes.

You'll still need Genie to switch regions for you, so flick to the tab supporting your software player (less popular players are under the Other tab) and set up your preferences. **E.T.E**

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iPod therefore i can



It does more than music, and on more than a Mac. Fiona Angus shows how to “Think Very Differently” about Apple’s versatile iPod.

The law of unintended consequences states that every action has an unexpected effect. It’s as good a law as any to explain why Apple’s ultra-portable MP3 player has spurred fans to push the iPod’s capabilities far beyond those even dreamt of by Steve Jobs himself.

For starters, iPod was born with unrealised potential. My music collection doesn’t fill the iPod’s 10GB drive (well, do you have 2,000 songs?). So I started using it as a portable hard drive, backing up and transferring all sorts of different files between Macs — a task ideal for the high-speed FireWire connection, with its 400Mbit/s data rate.

Now my iPod can read text files, carry contacts, sync email — even from Windows. Why stop there? Most of these so-called “hacks” are simply clever, lightweight bots written in AppleScript (an automated scripting language for Macs). Aspiring iPod software developers are calling for Apple to open up the iPod API (Application Program Interface). So rather than just manipulating iPod from the computer using these small scripts, they want to make software for the iPod itself, such as diaries, to-do lists and mobile phone-type games, only better.

Apple came one step closer to this dream when they announced the new 20GB iPod (with “wired” remote control and touch-sensitive scroll wheel) at Macworld in July would also have a calendar and enhanced playlist menu.

What started as a pure music player is evolving into an intriguing new style of information manager. Here’s how to pump up your iPod. And to make things easier, we’ve put most of the software on this month’s APC cover CD set.

THE IPOD HACKER’S FIRST AID KIT

Before any iPod hacking, get your hands on the official Apple iPod Updater 1.1. In an emergency it will erase and restore your iPod to factory settings. It adds the “contacts” menu and folder to your iPod so you can get creative with non-music files. Also, check out Apple’s iTunes Scripts collection of add-ons.

IPOD FOR WINDOWS!

Mac-envy is usually a temporary disorder that is quickly cured by a strong dose of incompatibility problems. No sooner was iPod released than a juicy rumour of an underground “hack” raced around the Net. Mac and Windows-based PCs living together in harmony? Astonished users from both camps sensed a seismic shift in their world view. It’s far less radical than



► The iPod Updater 1.1 gives you a groovy new equaliser and menu with great hacking potential.

you might think. The iPod is essentially a portable hard drive with a custom API for playing music files, propped up by clever design and marketing strategies. Yet like any other Macintosh drive (CD, Zip or even floppy) there are products that will let you read Mac media from Windows.

iPod hacks EphPod and XPlay are revamped versions of two well-established media reader programs called MacOpener and MacDrive. XPlay is an application that looks and feels exactly like Windows Explorer. You manage the iPod like it’s another hard drive. XPlay (US\$30, www.mediafour.com) has built-in Music and Playlist folders and you can autosync your Windows My Music Folder with iPod’s music Library.

EphPod (US\$49, free 15-day trial with MacOpener, www.ephpod.com) goes one step further, designing a PC iPod music manager as well as letting you access iPod like a regular portable hard drive. It even goes one better than iTunes by letting you read and manage contacts and files in your iPod from within the music manager.

Apple has announced an official iPod for Windows kit based on the MUSICMATCH Jukebox (www.musicmatch.com). However, the latest iTunes 3 release still offers the most comprehensive iPod music and file syncing tools, playlist sorting and menus.

Accessing your iPod from a Windows machine requires changing the firmware in iPod. You’re tinkering with the heart of iPod’s directory structure, so you don’t want to mess it up. XPlay and EphPod have mastered the black art of PC/Mac drive

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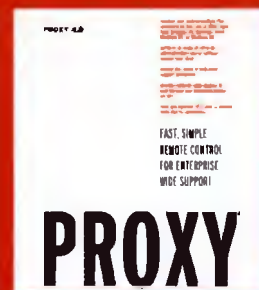
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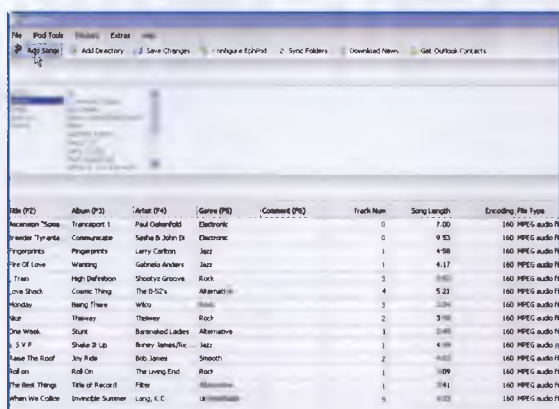
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All this straight out of the box



▶ ephpod lets you read and manage contacts and files in your iPod from within the music manager.

reading, but other (free or beta) PC hacks can be lethal. The first backyard firmware upgrade we tried decimated the file structure in our poor iPod. A lonely broken file icon was the only sign of life before emergency resuscitation in Apple iPod Updater 1.1 (if you don't have access to a Mac, the best rescue kit is in XPlay).

After you have a reliable Mac drive reader or iPod firmware upgrade working, you're free to try iPod management software for PCs. The funky bPod is a valiant attempt to create a Flash-based interface to manage iPod contacts.

What's really keeping iPod away from the world of Windows isn't the tired PC versus Mac conflict. It's that relatively few PCs come with the Apple-developed FireWire technology (adding a FireWire port to your desktop costs around \$100, or \$150 for a notebook PC Card).

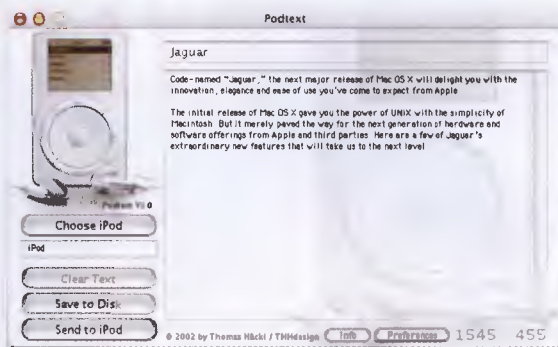
iPOD AND EMAIL

As alternative iPodding became more popular, Apple released three neat AppleScripts designed to store email contacts on iPod. Address Book to iPod transfers your address book on your desktop application to the iPod Contacts folder. Entourage to iPod does exactly the same thing for everyone using Microsoft Entourage (the Mac equivalent of Outlook). Palm Desktop to iPod imports and sorts contacts from Palm Desktop to iPod.

iPod It fully syncs Entourage Events, Contacts and Notes in the one friendly package. EntourageMail, EntourageEvents and EntourageNotes each mount a separate drive alongside iPod and it lets you manage each function from its own folder. K-Lendar makes monthly and weekly calendars.

THE LITERARY IPOD

Catch up on your reading while listening to music by saving text files to iPod. Applications such as iPod Text Editor lets you write and manage text on iPod by converting documents to V-card (.vcf) format. Launch it from your Mac and it appears as a separate drive beside your iPod. For smaller notes, Podtext gives you a small, iPod-esque interface to write and manage your thoughts. PodNotes has a small window to write and save notes straight to iPod.



▶ Manage your text with Podtext.

THE ODD POD

There are a growing army of off-the-wall programs for imaginative iPods. PodNews is the ultimate iPod gizmo. You can download headlines from Web sites, create and organise notes, import mail, request song lyrics from www.lyrictracker.com and even upload your Internet Bookmarks folder. IMsafe automatically copies everything on iPod (or any other folder or drive) to a safe folder on your computer. EscapePOD is a bare-bones MP3-maker that beats the convoluted ripping options in iTunes. It lists your iPod music Library in a browser window, select a song, and you instantly see an MP3 file on your desktop.

Musician's iPod Tools can show lists of gigs, instruments, song schedules etc. and can be converted and saved in two file types. The ContactsTool converts text files into V-Card format and the MP3Tool converts text files to MP3 format. Also, FileMaker to iPod lets you import data from the former to the latter.

iPOD FOR PENGUINS?

Now iPod has conquered the PC, only the Linux platform remains. Beta testing is underway for a Linux hack for iPod. It will take the form of a plugin to a Linux iTunes clone called xtunes (www.tex9.com/software/xpod). [ETC](#)

Pod links

Logon to the bizarre Web world of the iPod enthusiast.

The iPod Lounge: Avid iPoders share their passion

www.ipodlounge.com

iPodding: latest news and software for iPod

www.ipodding.com

iPodHacks: alternative iPoders bent on prying iPod open to new applications and platforms

www.ipodhacks.com

iPod Update Archive: Every iPod OS since 1.0.1

www.home.earthlink.net/~themacfreak/ipodarchive

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Cheap tune-up for Photoshop



Want to boost Photoshop's load-time and performance without spending a cent? Trevor Morris reveals some turbocharged tricks.

Looking for a way to get better performance from Photoshop and ImageReady? Well, you *could* buy the latest processor (or two), heaps of RAM and more hard drive space than common sense. Or, you could optimise your current system to get the best performance possible out of your hardware.

Presumably you prefer the cheaper alternative. So do we! This involves tweaking a few settings and performing some general system maintenance, thus improving Photoshop's startup time and enabling snappier responses from memory-intensive filters. Try striking the right balance between your workflow requirements and the resources at your disposal.

Don't expect to slash Photoshop's lengthy load-time in half, but if you open and close Photoshop as much as I do, you'll appreciate the gains that can be made. Assuming a default installation on a PC, the folder locations referenced throughout this workshop should be as follows:

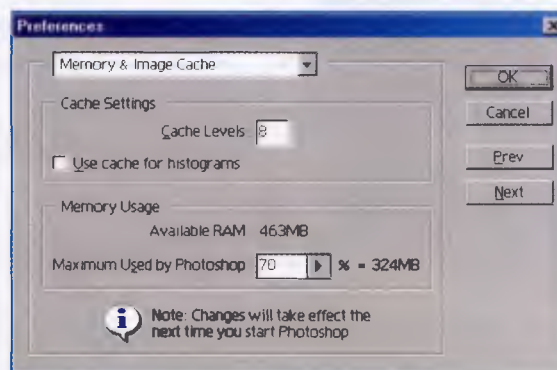
Folder Name	Path
Photoshop	C:\Program Files\Adobe\Photoshop 7.0
Plug-ins	C:\Program Files\Adobe\Photoshop 7.0\Plug-Ins
Presets	C:\Program Files\Adobe\Photoshop 7.0\Presets
Settings	C:\Windows\Application Data\Adobe\Photoshop7.0\Adobe Photoshop 7.0 Settings
Color Profiles	C:\Windows\System\Color
Adobe Fonts	C:\Program Files\Common Files\Adobe\Fonts
System Fonts	C:\Windows\Fonts

RESPONSE TIME

Begin by ensuring that Photoshop's Virtual Memory settings are configured correctly. Choose Edit, Preferences, Plug-ins & Scratch Disks (Ctrl+K; Ctrl+7) and select the drives and/or partitions that you want Photoshop to use (up to a maximum of 200GB on four volumes). For best performance, select a fast, dedicated drive or partition.

You should never use network or removable drives as scratch disks since their read/write speeds are far too slow. Also, avoid assigning Photoshop's scratch disks to the same volume used for the operating system's virtual memory, as this may result in a competition for resources.

Before closing the Preferences dialog box, choose Memory & Image Cache (Ctrl+8). By default, Cache Levels is set to 4, which means that Photoshop will store four low-resolution



► Photoshop's Memory & Image Cache dialog box.

previews of the current image in memory: one of each for 100%, 75%, 50% and 25%. As a result, any edits that you perform at these zoom levels will redraw more quickly than those performed at non-cached zoom levels.

At the maximum value of eight, Photoshop stores eight previews, but at the expense of more memory. If you have more than 64MB of RAM (and any serious Photoshop user will) I recommend using eight; otherwise, stick with the default value of four.

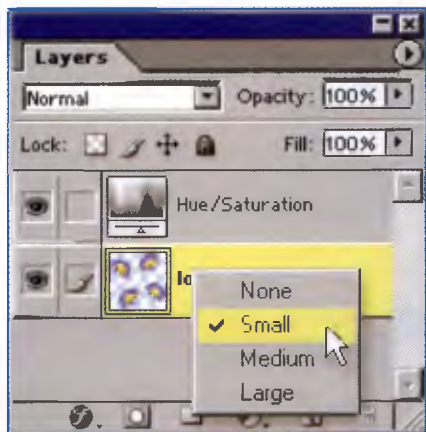
The Memory setting in this dialog box determines what maximum portion of physical memory should be allocated to Photoshop. There are two important factors to consider when setting this value. Entering a figure that's too high may deprive the operating system and other applications of the RAM they require to function adequately. This could ultimately result in poor performance for *all* applications, not just Photoshop.

Secondly, if you only have 200MB of scratch disk space available, Photoshop will use no more than 200MB of RAM, regardless of how much memory you assign. I recommend using a memory setting of between 50% and 70%. Adobe suggests using a value that is at least 3-5 times the size of the average image you work with, plus an additional 5-10MB.

Many of Photoshop's palettes provide you with important visual information in the form of thumbnails or previews, for example the Layers, Paths and Channels palettes (and the Animation, Rollover and Slice palettes in ImageReady).

However, this comes at the expense of both memory and speed. To configure the size of the previews for each palette, right-click on an empty part of the palette, or choose Palette Options from the palette menu.

Choose from: None (12 x 12), Small (28 x 28), Medium (52 x 52) and Large (76 x 76). I recommend using either None, which



► For best performance, choose None or Small for palette thumbnails.

doesn't require any rendering time, or Small, which requires relatively little time to render.

LIGHTEN THE LOAD

One way to reduce Photoshop's boot time is to delete all unnecessary presets. For example, you can save several hundred KB by deleting all of the default Styles, Tool Presets and Custom Shapes in both Photoshop and ImageReady. To trim your presets you may either use each preset's respective palette (such as, Styles palette, Gradient Editor dialog box, Customer Shape picker), or you can do everything from within the Preset Manager (Edit, Preset Manager). In either case, simply Alt, click on a preset to delete it — the cursor will turn into a pair of scissors.

Although it's always wise to backup your settings and files before deleting things, you needn't worry too much in this situation. There are two simple ways to restore Photoshop's defaults preferences. To restore an individual palette's default settings, just delete the appropriate palette preferences file (it has the file extension "PSP") within Photoshop's Settings folder. To reset all settings to their defaults, hold down Ctrl+Alt+Shift while booting Photoshop. At this point, you should shut down Photoshop to save your settings.

Another way to speed up Photoshop's boot time is to disable any plug-ins that you do not use. For example, Photoshop comes with a set of plug-ins that read, write and detect digital watermarks. Not only do these plug-ins add to the time required to boot Photoshop, but they also increase the time it takes to open each image.

To disable these filters, locate the Plug-ins\Digimarc subfolder and add a tilde (~) to the beginning of the folder name (~Digimarc).

Follow the same procedure to disable any of the file formats that you never use. Within the Plug-ins\File Formats subfolder, identify those file formats that you do use on a regular basis and add a tilde to the beginning of their file names (e.g., ~Pixar.8bi).

Also check the file formats in the Plug-Ins\Adobe Photoshop Only\File Formats and Plug-Ins\Adobe ImageReady Only\File Formats subfolders. To disable multiple

Adobe Photoshop



Delete the Adobe Photoshop Settings File?

Yes

No

► Hold down Ctrl, Alt, Shift while booting Photoshop to reset all settings to their defaults.

files simultaneously, place them into a subfolder with a name beginning with a tilde (e.g., ~Disabled).

When starting up, Photoshop checks both the System Fonts and Adobe Fonts folders to determine the number of fonts available for use with the Type tools. If you have a lot of fonts installed, this can significantly increase the time it takes for Photoshop to load. The Adobe Fonts folder may be used to store fonts that will only be recognised by Adobe applications; however, you should limit the number of fonts in this folder to those that you use on a regular basis.

The System Fonts folder contains fonts installed by your operating system and may be used by many applications, including Photoshop and ImageReady (such as, Arial, Times New Roman, Courier). If you want to remove any fonts in the System Fonts folder, you should back them up. Unfortunately, you cannot hide fonts within subfolders prefixed with a tilde (like above). All fonts, even those with subfolder, will be enumerated by Photoshop upon startup.

Like fonts, all colour profiles (ICM and ICC files) that are installed on your system are read by Photoshop upon startup, so it's a good idea to uninstall or remove any color profiles that are not required. 

Additional resources

For more information about optimising Photoshop's performance, check out the following links from the Adobe Web site:

Optimizing Performance in Photoshop for Windows

www.adobe.com/support/techdocs/12dde.htm

Optimizing Performance in Photoshop for Mac

www.adobe.com/support/techdocs/c9ba.htm

There is also plenty of useful information in the Adobe Photoshop Read Me file located in the root of the Photoshop installation folder. See the section titled Improving Performance and Troubleshooting.

For Mac users, when following the instructions in this article, please substitute these keys:

Option for Alt
Command for Control
Control, click for Right-click

Self service



Ashley McKinnon shows you how to set up a personal FTP server on your desktop PC: it's fast, easy and costs nothing!

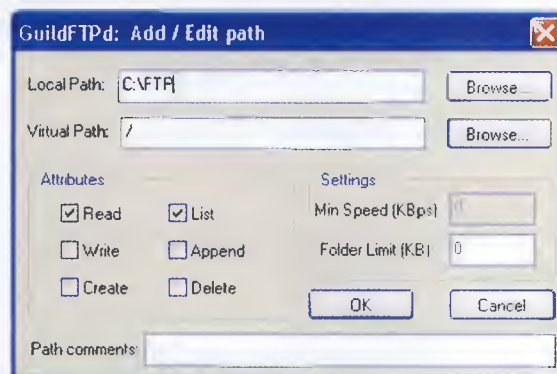
Sick of emailing large files to family? Are you constantly on the move but regularly need access to your desktop data? Want to share the downloaded goodies from your broadband Internet connection with others?

If you answered yes to any of these questions, then setting up a personal FTP server on your home or business PC will make your life a lot easier. But don't think that running an FTP server is a black art restricted to the IT professional.

APC has trawled the Net to find the perfect FTP server program for you and came up trumps with GuildFTPd, which is included on this month's cover CD (or download it from www.nitrollic.com). GuildFTPd is simple to use, easy on system resources and is totally free.

SETTING UP YOUR SERVER

GuildFTPd's installation routine is very simple, and when run for the first time arrives at the main GuildFTPd administration



Any directory on your local hard drive can be used as the FTP server's default directory.

interface. This is where all monitoring and configuration takes place (with a familiar Windows Explorer look as well).

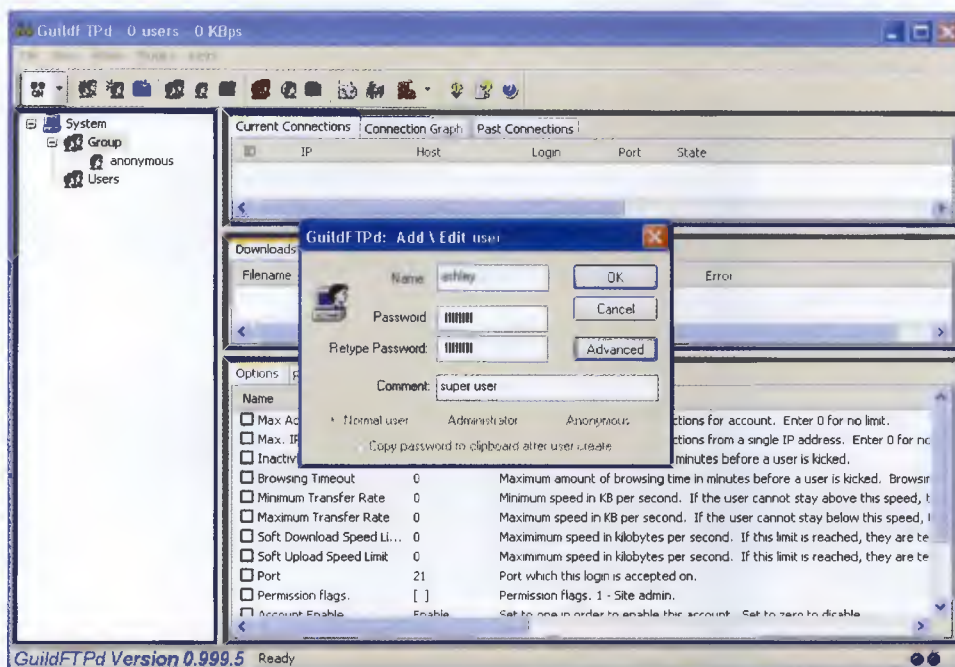
At this stage the server is already running — so all you need to do is make some basic configuration settings and you're away.

ADDING USERS

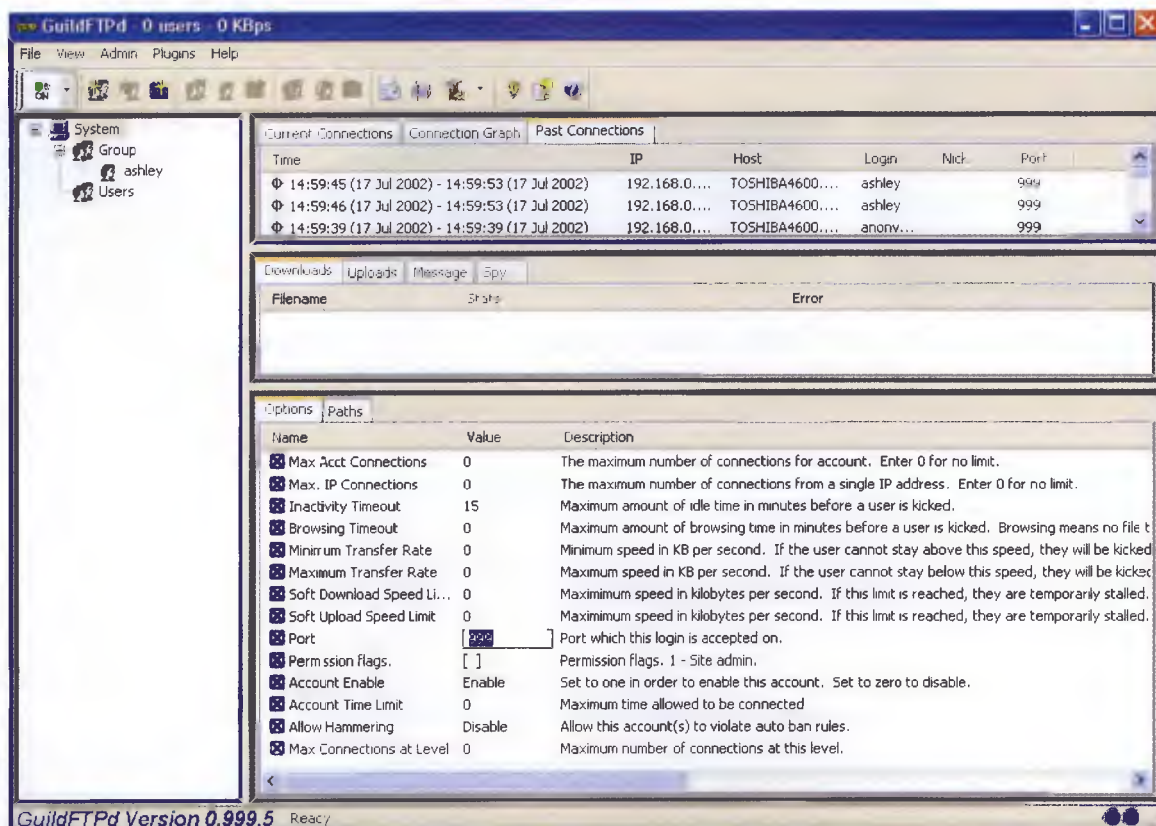
The first task is to set up users authorised to connect to your server. You can either use the default Group, or click on the Group icon and create a new group. Once this is done, clicking the New User icon brings up a configuration window (right). Enter each user's name and an appropriate password. GuildFTPd doesn't have a limit to the number of users you can set up.

You can create a unique account for every user, each with its own set of privileges; accounts that permit access to a specific single directory (great for anyone who wants to download MP3 files from your Music folder, for example); or a mixture of both.

By default, GuildFTPd includes an anonymous account which means users don't need to supply a username and password to connect to the server. But if you don't want this, simply delete this account.



Setting up a new user is as simple as assigning a username and password.



Try to not leave the FTP server running on the default port of 21. Setting to a different number makes the FTP server more secure and harder to see.

CHOOSING DIRECTORIES

Now set the default path that will be used as the root FTP directory. This is the first location users will see when they log in. Press F4 or select Admin/Add Path to open the Add/Edit Path window. Browse to the desired folder and make sure the Virtual Path is set to a / (slash), which maps that folder as the root directory.

If you'd like other directories to be accessible through the server, repeat the process and give each a descriptive name as its Virtual Path. This lets you construct a complete and easy to navigate folder structure within the FTP site without having to physically reorganise your local hard drive. Specific rights such as read, write and execute can also be attributed to the directories.

At this point users will be able to connect to the FTP server and either download or upload files at will.

TWEAK IT UP AND LOCK IT DOWN

By default, the FTP server is married to port 21. This is designed so that Web browsers can easily connect to your site, but for security reasons you might want to change this so that stray visitors can't idly browse through your system.

Click on Port value in the options window to change the port assignment, but make sure you notify anyone who'll use your server, so they can specify the correct port when trying to connect.

While at the options window, you can also set the maximum number of simultaneous users connected to the

FTP server. You can also limit the number of connections from one PC by setting the maximum connections per IP address, although this will reduce the effectiveness of download helpers such as Flashget or GoZilla, which establish multiple connections to an FTP site to maximise download bandwidth.

If you've protected your PC with a firewall, expect some additional config tweaking. Depending on your firewall, you can either set it to accept traffic from the IP addresses of your friends and colleagues, or set it to accept all traffic on a specific port (in which case we *strongly* recommend changing from the default port of 21).

You can tinker with many other options that will affect the speed and usability of the FTP server. Blind experimentation is not recommended — use GuildFTPd's online help or dive into the excellent support documentation at www.nitrolinc.com. This is also loaded with hints on using GuildFTPd Server with various operating systems (including Windows XP), firewall products and enabling FTP access from within your browser. **FTP**

FTP and your ISP

Check with your ISP before setting up an FTP server, especially if you're going to be inviting a lot of users to a download frenzy. Hosting an FTP server could put violation of the ISP's code of conduct, and all that extra traffic will almost certainly attract attention.

Next month...

IN THE OCTOBER ISSUE OF

apc



Don't panic!

Hardware hassles? Disk disasters? We've got the experts' guide to beating those woes: from prevention to troubleshooting tips and surviving a system meltdown.



NAS hardware

Speed up and safeguard your office network with a network-attached storage drive. APC tests the latest contenders from the leading vendors and reveals who can be trusted with your data.



Managed PCs

How you can win back control of your IT destiny with built-for-business desktop PCs that deliver fast rollout, full lockdown and headache-free management.

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IT'S ALL IN THE OCTOBER ISSUE OF APC, ON SALE SEPTEMBER 18

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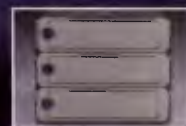


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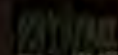
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612Mb DDR RAM PC2100 ECC Reg
80GB Seagate 7200rpm ATA 100
A-Open H800Deluxe Case 300W
Add Monitor from Monitor List
64Mb GeForce 4 MX440 TV Out
Ps II K/B & Logitech Optical Mouse
32x10x40 CD-RW LG or Diamond
Creative DE 5.1 PCI Sound Card
120W Subwoofer Speaker

Compaq Notebook

Presario 2800 P 4 1.4G 256Mb 20G CD-RW 14.1" TFT 32Mb 56K 10/100 W xp	\$3,485
Presario 2815 P 4 1.8G 256Mb 40G CD-RW/DVD 15" TFT 64Mb 56K 10/100 Wxp	\$4,975
EVO N1000v P 4 2.0 256Mb 30Gb 15" TFT CD-RW/DVD 56K 10/100 W xp	\$3,900
EVO N1000v P 4 2.0 256Mb 20Gb 14" TFT DVD 56K 10/100 W xp pro	\$3,440
EVO N800v P 4 1.6 256Mb 30Gb 15" TFT DVD 56K 10/100 W xp pro	\$3,720
EVO N800v P 4 1.7 256Mb 40Gb 15" TFT DVD/CDRW 56K 10/100 W xp pro	\$4,399
Presario 1722 P III 1G 256Mb 30Gb 8xDVD 14.1" TFT 56K 10/100 Firewire	\$3,380
Presario 700 Athlon4 1G 256Mb 20Gb 8xDVD 14.1" TFT 56K 10/100	\$3,045
Armada E500 P III 1G 128Mb 20Gb 8xDVD 14" TFT 56K & 10/100 Win98	\$3,045
Armada E500 P III 1G 128Mb 20Gb 8 x DVD 14" TFT 56K & 10/100 Win 2k	\$3,165
EVO N110 P III 1G 256Mb 20Gb 14.1" TFT DVD 56K & 10/100 Nic Win Me/98	\$2,575

Toshiba Notebook

Satellite 1400 P 1.2G C 128Mb 20Gb 8 x DVD 14.1" TFT 56K/10/100 W XP Pro	\$2,510
Satellite 3000 P III 1.1G 128Mb 20Gb 8xDVD 14.1" TFT 56K/10/100 W XP	\$3,510
Satellite Pro TE2000 P III 1G 128Mb 20Gb 8xDVD 14.1" TFT 56K 10/100 W98	\$2,885
Satellite Pro TE2000 P III 1G 128Mb 20Gb 8xDVD 14.1" TFT 56K 10/100 WXP Pro	\$3,085
Satellite Pro TE2000 P III 1.1G 256Mb 20Gb 8xDVD 14.1" TFT 56K 10/100 W98	\$3,325
Satellite Pro TE2000 P III 1.1G 256Mb 20G 8xDVD 14.1" TFT 56K 10/100 xp Pro	\$3,495
Satellite Pro TE2000 P III 1.2G 256Mb 30G CD-RW/DVD 14.1" TFT 56K 10/100 W98	\$3,915
Satellite Pro TE2000 P III 1.2G 256Mb 30G CD-RW/DVD 14.1" TFT 56K 10/100 xp	\$4,085
Satellite Pro E100 P 4 1.6G 256Mb 30G DVD/CDRW 15" TFT 56K F/M 10/100 XP	\$4,025
Satellite Pro E100 P 4 1.6G 256Mb 30G DVD/CDRW 15" TFT 56K F/M 10/100 XP	\$4,025
Portege 4000 P III 750Mhz 128Mb 10Gb 56K F/M 12.1" TFT Wireless Lan Win2K	\$3,485

Excel Series Notebook

P 4 1.7G 256m 20g 24xCD 14.1" TFT 56K 10/100 1394Firewire TV out W XP	\$2,585
P 4 1.7G 256m 20g 8xDVD 14.1" TFT 56K 10/100 1394Firewire TV out W XP	\$2,885
P 4 2.0G 256m 20g 24xCD 14.1" TFT 56K 10/100 1394Firewire TV out W XP	\$2,789
P 4 2.0G 256m 20g DVD/CDRW 14.1" TFT 56K 10/100 1394 TV out W XP	\$3,098

Motherboard

GA-8IEXP Intel 845 533FSB USB 2.0 + Raid + Firewire + Intel 10/100 + Sound	\$289
GA-7VRXP 333MHz DDR 10/100 Raid Control Creative Sound	\$218
GA-7RX VIA KT333A Chipset USB 2.0 with Sound Card	\$175
ASUS Motherboard	
ASUS A7V333 DDR 333 USB 2.0 Chipset for AMD	\$250
ASUS A7V333 - Raid DDR 333 USB 2.0 with Raid	\$319
ASUS A7M-D Dual AMD with 780MPX Chipset	\$565
ASUS P4T E Pentium 4 Motherboard Socket 478	\$340
ASUSTEK P4B533 Intel 845E 533FSB USB 2.0	\$345
MSI Motherboard	
MSI 845E MAX 2 533FSB DDR USB 2.0 + Raid + ATA 133+ 10/100 Network	\$280
MSI KT3 Ultra ARU 333 MHz DDR USB 2.0 + Raid + ATA 133	\$259
Abit Motherboard	
Abit KX7333 VIA 333	\$235
Abit KX7333 VIA 333 Raid	\$295
Abit BD7M socket 478 Intel 845 Chipset DDR	\$178
Tyan AMD Dual Motherboard	
Tyan AMD Dual S2468NG 10/100 Network Card	\$1,025
Tyan AMD Dual S2466-4M IDE Motherboard 10/100 Network	\$470
Intel Motherboard	
Intel 845GBV 533FSB + Intel SVGA Built in + USB2.0 + Sound	\$229
Intel 845BG2 Intel 845E Chipset 533FSB + USB2.0 + Sound	\$229
Intel Pentium 4 M/B Intel 845WN Chipset Socket 478 SD Ram	\$228
Intel 880EMV2L Intel 850E Chipset 533FSB DDR Intel 10/100	\$315

SVGA Card

8Mb SIS PCI SVGA Card	\$59
8Mb SIS AGP SVGA Card	\$52
Matrox SVGA Card	
Matrox G550 32m Dualhead TV	\$278
Power Colour SVGA Card	
32Mb RIVA TNT II M64 AGP	\$79
ASUS SVGA Card	
V8480 Geforce 4 128M	\$865
V8440 Geforce 4 128M	\$480
ASUS Geforce 4 MX440	\$210
Leadtek	
128Mb Geforce 4 4800	\$850
128Mb Geforce 4 4600 VIVO	\$885
64Mb Geforce 4 4200	\$345
64Mb Geforce 4 MX440	\$190
64Mb Geforce II Mx 400 TV Out	\$145
Excel SVGA Card	
64Mb Geforce 4 MX440	\$170
64Mb Geforce II Mx 400	\$99
Hercules	
32mb 3D Prophet 4000XT AGP	\$115
64mb 3D Prophet 4500AGP + TV	\$255
64mb 3D Prophet III Titanium 500	\$699
64Mb All-in-wonder 7500	\$345
64Mb FDX 8500LE	\$295
64Mb All-in-wonder 8500DV	\$670
Printer	
HP656 Colour	\$115
HP948C	\$255
Epson Photo 810	\$339
Epson Photo 1290 A3+	\$620
Epson Stylus 3000 A2	\$1,865
Zip Drive	
100Mb Internal Zip Drive	\$128
250Mb Internal Zip Drive	\$185
100Mb External Zip Parallel	\$225
250Mb External Zip Parallel	\$335
250Mb External Zip USB	\$299
100Mb External Zip USB	\$179

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AMD Athlon XP 2000+	\$1,745
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TI Deluxe Server Case 350W Power
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AMD Athlon XP 1900+	\$1,010
AMD Athlon XP 2000+	\$1,075
AMD Athlon XP 2100+	\$1,145

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A-Open Deluxe KF-45 ATA Case
Add Monitor from Monitor List
64Mb Geforce II MX400
Ps II Acer Keyboard & Wheel Mouse
52 Speed Acer CD-ROM
Built in 3D Sound Card
3.5" FDD Panasonic
120W Power Speaker

TI AMD Deluxe Pack

AMD Athlon XP 1800+	\$1,235
AMD Athlon XP 1900+	\$1,295
AMD Athlon XP 2000+	\$1,340
AMD Athlon XP 2100+	\$1,398

GA 7VRX M/B 333DDR USB 2.0
256Mb DDR PC2700 Kingmax
60GB Seagate barracuda 4 7200rpm
3.5" FDD Panasonic
TI Deluxe Server Case 350W Power
64Mb Geforce 4 MX440 TV Out
MS Ps II Keyboard & Optical Mouse
Add Monitor from Monitor List
LG or Diamond 32 x 10 x 40 CD-RW
3D Sound Card
600W Subwoofer Speaker

TI P4 Value Pack

Pentium 4 1.7Ghz	\$1,039
Pentium 4 2.0Ghz	\$1,185
Pentium 4 2.2Ghz 533FSB	\$1,305
Pentium 4 2.4Ghz 533FSB	\$1,615
Pentium 4 2.53Ghz 533FSB	\$2,080

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Acer PS II Keyboard & Mouse
Add Monitor from Monitor List
LG or Diamond 32 x 10 x 40 CD-RW
Built in Sound Card
120W Power Speakers

TI P4 Dream Pack

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Pentium 4 2.0Ghz	\$1,490
Pentium 4 2.2Ghz 533FSB	\$1,595
Pentium 4 2.4Ghz 533FSB	\$1,899
Pentium 4 2.53Ghz 533FSB	\$2,390

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80Gb Seagate 7200rpm ATA100
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TI Deluxe Server Case 350W Power
64Mb Geforce 4 MX440 TV out
MS Internet KB & Intellimouse
Add Monitor from Monitor List
52 Speed CD-ROM A-Open
Built in Sound Card
120W Power Speakers

TI P4 Deluxe Pack

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Pentium 4 2.0Ghz	\$1,685
Pentium 4 2.2Ghz 533FSB	\$1,795
Pentium 4 2.4Ghz 533FSB	\$2,080
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USB 2.0 + Raid + ATA133
256Mb DDR RAM Kingston
80GB Seagate 7200rpm
3.5" FDD Panasonic
TI Deluxe Server Case 350W Power
Leadtek Geforce 4 Ti 4200 DDR
MS internet Keyboard & Optical Mouse
Add Monitor from Monitor List
LG or Diamond 32 x 10 x 40 CD-RW
3D Sound Card + Speakers

CPU

Pentium 1.2G Celeron Intel CPU	\$149
Pentium 1.3G Celeron Intel CPU	\$163
Pentium 1.7GB Celeron 478	\$179
P 4 2.26G 533FSB	\$520
P 4 2.4G 533FSB	\$829
P 4 2.53G 533FSB	\$1,299
Pentium 4 1.7Ghz Socket 478 3305	\$405
Pentium 4 2GHZ Socket 478	\$315
AMD K7 1.33 G CPU C 268FSB	\$199
AMD Athlon XP 2000+	\$325
AMD Athlon XP 2100+	\$395
AMD Athlon XP 1800+	\$218
AMD Athlon XP 1900+	\$278
AMD Athlon MP 1900	\$392
AMD Athlon MP 2000	\$485

All CPU is retail pack with Fan

Hub

Acer 8 Port 10 Mbps Hub BNC	\$69
Netgear 8 Port 10/100 DS108	\$215
Netgear 16 Port 10/100 DS516	\$620
Netgear 24 Port 10/100 DS524	\$750

Switch

Skylink 8 Port 10/100 Switch	\$105
Skylink 16 Port 10/100 Switch	\$290
Netgear 5 Port Switch FS105	\$133
Netgear 8 Port Switch FS108	\$185
Netgear 16 Port Switch FS116	\$375
Netgear 16 Port Switch FS516	\$590
Netgear 24 Port Switch FS524	\$699
Netgear 24 Port Switch FS524S	\$1,320
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Netgear PS113	\$299
Netgear PS110	\$265
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Netgear RP114	\$245
Netgear MR314	\$495
Netgear FV316	\$455

FAX Modem

56K Netcom Internal F/M	\$45
56K Web Excel External F/M	\$90
56K Netcom 56K V90 Serial	\$99
56K Netcom Roadster USB	\$168
56K PCMCIA Kingmax F/M	\$115

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256Mb DDR RAM PC2100	\$149
256Mb DDR RAM PC2700	\$165
128Mb RD Ram PC800	\$115
256Mb RD Ram PC800	\$225
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Maxtor 40G 7200 rpm ATA133	\$155
Maxtor 60G 7200 rpm ATA133	\$185
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60G Seagate 7200rpm ATA100	\$168
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Cheetah 36Gb 10,000rpm U160	\$565
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Fujitsu 20GB 9.5mm	\$218
IBM Travelstar 10GB IDE 9.5mm	\$185
IBM Travelstar 20GB IDE 9.5mm	\$215
IBM Travelstar 40GB IDE 9.5mm	\$375

Scanner

HP2300 Scanner	\$155
HP5300 Scanner	\$340
Canon N640 Parallel Scanner	\$139
Canon N640U USB	\$152
Canon N1250U2 USB Scanner	\$215
Canon N1250U2F USB Scanner	\$282
Epson 1650SU	\$355
Epson 1650SU Photo	\$435

Sound Card

Hercules Game TheaterXP	\$248
Creative Live DE 5.1	\$79
Creative Live Platinum	\$325
Creative Audigy DE	\$180
Creative Platinum	\$278
GA 1394 Firewire Card	\$68

Monitor

Hitachi 17" CM815 0.23dpi	\$298
Hitachi 17" CM821 0.23dpi	\$356
Hitachi 19" CM721 0.180pi FlatScreen	\$565
Hitachi 15" CML153XW LCD	\$835
Hitachi 17" CML171SXW LCD	\$1,450
Hitachi 18" CML181SXW LCD	\$1,925
Acer 17" AcerView	\$265
Acer 15" LCD 502 With Speaker	\$780
AOC 15" LCD Monitor	\$785
Mitsubishi 15" D/View	\$225
Mitsubishi 17" D/View 1770	\$278
Mitsubishi 19" D/View 1998	\$468
Mitsubishi 21" D/View 2115E	\$1,285
Mitsubishi 15" DV152 LCD	\$785
17" Samsung SyncMaster 753DF	\$369
19" Samsung SyncMaster 955DF	\$578
17" LG 775FT FlatScreen	\$365
17" Sony E230 FlatScreen	\$538
19" Sony G420 FlatScreen	\$935
Sony SDM-S51 15" LCD	\$935
Sony SDM-S81 18" LCD	\$2,550

CD-ROM/DVD

52x CD-ROM A-Open	\$58
Pioneer 16 x Speed DVD	\$105
Pioneer DVR-A04 6 in 1	\$915
CD-Writer	
LG 32x10x40 CD-RW	\$115
Mitsubishi 32x10x40 CD-RW	\$115
Sony 40x12x48 CD-RW	\$185
omega USB2.0 24x10x40	\$410
Benq Mini USB 8x8x24 CD-RW	\$345
SCSI Control Card	
Adaptec 19160 Card	\$330
Adaptec 29160 Card	\$425
Adaptec 39160 Card	\$530

Network Card

A-Open 10/100 PCI	\$25
Dlink 10/100 PCI	\$49
3 Com Etherlink LX 10/100 PCI	\$85
Intel Ether Express 10/100 PCI	\$72
Pcmcia 10/100 Kingmax real port	\$108
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ATX Format

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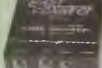
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Will allow any Fax or Modem device to operate with the Telstra FaxStream Duet service. Provides fully automatic fax reception, just like having a separate line. Two models available.



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Integrate ANY Fax (or Modem) into ANY telephone line for fully automatic fax reception. Operates with or without an answering machine. Just plug it into any telephone socket. Two models available.



AUTO MODEM RECEPTION

Choose FMX-PRO when you wish to fit a Modem to your Fax line and the Modem also needs to receive data calls. Directs Fax calls to your Fax and Data Calls to Modem. Bargain-in protection is provided to prevent one device interrupting the other while it is in use.



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Choose AUTO-CONNECT when you wish to fit a Modem or EFT-POS unit to your Fax line, to make OUTGOING calls. Provides automatic connection on dialing. Other device is then locked out. Ideal for connection of Payphones, Modems and EFT-POS to any Fax, Commander, PABX or any type of Telephone line.



TELEPHONE CALL RECORDING AND OTHER APPLICATIONS

CALL RECORDING UNIT

Record your telephone calls to PC, or other recorder, from an ordinary single line or any multi-line phone system. Automatic operation with start/stop capability from any handset. PC software & cables supplied.



EASYPASS MULTIPLE NUMBER

Operate Two numbers on one line. Auto-Connect will connect your Multiple number calls to one set of phones or answering machine and your Normal number calls to another set of phones or answering machine.



TWO LINE SELECTOR

Now you can connect TWO telephone lines (Telstra, Optus, ISDN or Tie Line) to one EFT-POS, Fax, Modem, Cordless Telephone, Answering Machine or any Telephone device. Receive incoming calls from either line. Make outgoing calls on either line.



NETWORK ISOLATION UNIT

100% Network Firewall Protection! This unit automatically disconnects your Modem Server from your network whenever the modem makes or receives calls and reconnects the modem when it is finished.



MUSIC OR MESSAGE ON HOLD FOR ANY LINE

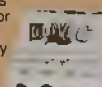
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DMC is Australia's #1 Message on Hold player. Low Cost, High Quality unit provides many years of trouble free operation. Message updates via plug in non volatile digital memory cartridges. Fit DMC and stop paying Radio on Hold licence fees.



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Just plug our MOH Line Sharer into any socket on your telephone line, connect any audio source (Radio, PC or DMC) and you now have a professional telephone line On Hold facility for your existing telephones.



AUTOMATIC ATTENDANT

Our single line CALL ATTENDANT will answer your Incoming calls after 4, 6 or 8 rings, play a greeting & message to your callers until you are able to answer. Also provides Message on Hold facility.



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REMOTE TELEPHONE ACTIVATOR

Call in to Switch ON, Switch OFF or RESET your PC, SERVER or any electrical equipment by telephone line using touch tone commands. RTA connects to any telephone line. Requires PCU or PCR accessory.



RTA-PRO VERSION

PRO version provides independent control of 2 separate outputs with PIN number security. Status tones for each output are provided on answer. Shares an existing line when used with the Multiple Number service.



POWER CONTROL UNIT

PCU connects direct to the RTA and also to your power socket to allow telephone line dial in switching of the 240V supply connected to your equipment. Easy Plug In User Installation. Controls up to 10 Amps.



PC RESET UNIT

PCR connects to any PC to allow remote telephone PC RESET, or can also be used to turn ON or OFF PC's with ATX style motherboards. Easy User Installation.



TELEPHONE LINE DOOR STATION AND EXTENSION TRANSFER

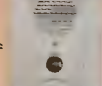
DOOR STATION UNIT

Will RING all of your telephones when a visitor arrives at your front door or gate. Answer to communicate. Open the door or gate with touch tones. Operates on any ordinary single line or multi-line phone system. Requires surface mount or flush mount door phone.



SURFACE MOUNT DOOR PHONE

This unit provides for quick and easy mounting direct onto any wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



FLUSH MOUNT DOOR PHONE

This attractive Stainless Steel unit is designed for a flat recessed fit into your wall surface. Your visitor just presses the integral call button to ring your telephones. Provides clear 2 way communication as soon as you answer.



TELEPHONE CALL TRANSFER

Easy-Transfer allows you to answer a call on one telephone and then TRANSFER the call to another telephone fitted to the same line. Also provides INTERCOM facility. Uses your existing telephones.



ARE YOUR PRODUCTS OR SERVICES WORTH TALKING ABOUT ?

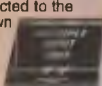
TALKING DISPLAY UNIT

TDU will play 1 or more pre-recorded messages as soon as it is triggered by a movement sensor, a switch, or at a preset time interval. Ideal for Product Promotions, Product Information, Message Warnings etc.



MULTIPLE INPUT UNIT

MIU allows for up to 12 separate movement sensors or switches to be connected to the TDU. Each sensor triggers its own unique message, output via any 8 ohm unpowered, powered or amplified speaker.



SPEAKER SWITCHING UNIT

SSU allows for up to 12 separate speakers to be connected to the TDU so that each sensor triggers its own separate message, output on its own separate speaker. Background music can be played at all other times.



AUDIO SWITCHING UNIT

ASU allows the TDU to be connected to any existing PA or Background Music system. The existing PA or Background Music system is then muted or faded whenever a TDU message is broadcast and then reconnected when finished.



TELEPHONE LINE SIMULATORS FOR TESTING, TRAINING, DEMONSTRATION

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Will allow any 2 telephone devices to ring and communicate with each other, without the need to make costly calls and occupy 2 lines. Ideal for Testing, Training & Demonstration of all telephone devices.



RINGMASTER PRO

Provides all facilities of the STD model, and in addition provides Australian Dial Tone, Busy Tone and multiple ring outputs including FaxStream Duet & Multiple Number ring. Also available with USA, UK, or other output.



RINGMASTER CLI

Provides all facilities of the PRO model and in addition will generate CallerID (Calling Number Display) output in conjunction with any Telstra ring pattern. Provides 10 preset outputs, plus Alphanumeric & user definable transmissions.



RINGMASTER INTERNATIONAL

International Version provides switch selectable dial tone, busy tone and ring output emulation for over 20 countries. Ideal for exporters of telecommunications equipment.



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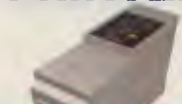
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CC-4BK	BCI-21	BJC-2000/4000/5000 Series Black	\$7.00
CC-5CL	BCI-21C	BJC-2000/4000/5000 Series 3-Colour	\$12.00
CC-6BKHC	BJI-201BK HC	BJC-600/610/620 Hi-Cap Black (14ML)	\$9.00
CC-7BK	BCI-10	BJ-30 Black	\$9.00
CC-8BK	BCI-11	BJC-70 Black	\$9.00
CC-9CL	BCI-11C	BJC-70 3-Colour	\$17.00
CC-11CL	BCI-61	BJC-7000 Series 3-Colour	\$32.00
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HP Desk Jet 700/800/900/1000 Series	8	29-BKL
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HP Colour Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Colour Desk Jet 600C/660C/690C Series	3x12	14B-CLR
HP Desk Jet 850C/855C/870C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
EPSON Stylus Colour /PRO/XL	3x4	16-CLR
EPSON Stylus 820/colour II/III	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/700/740/760/900	3x12	34B-CLR
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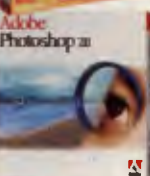
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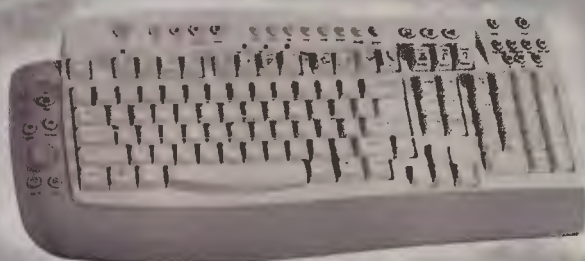
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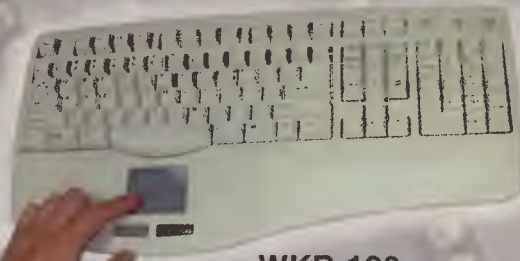


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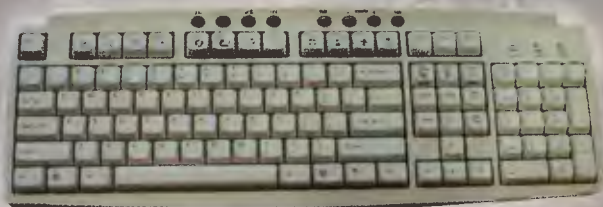
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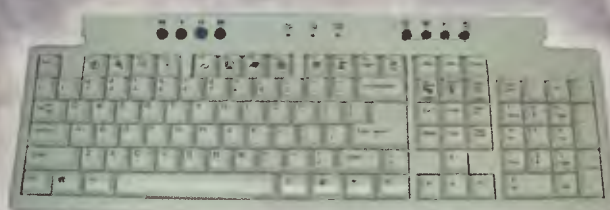
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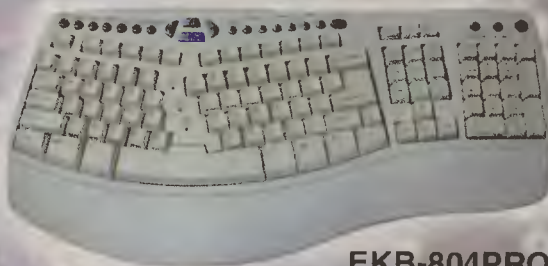
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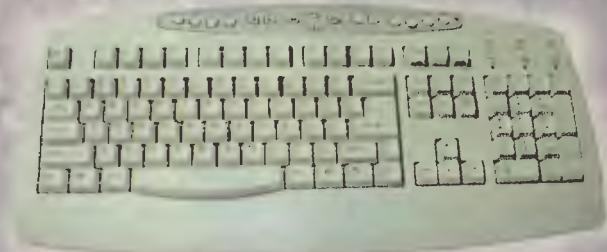
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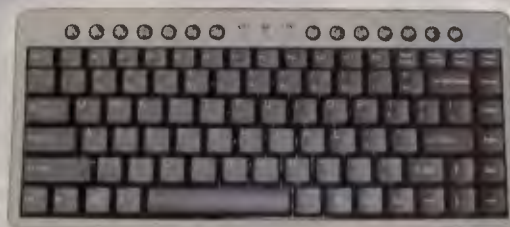
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ASUS 32x10x40	\$155	LG 24x10x40	\$104	MSI 40x12x48	\$120		
ASUS 48x16x48	\$175	LG 32x10x40	\$111	RICOH 20x10x40, 12xDVD	\$310		
BEN Q 24x10x40	\$90	LG 40x12x40	\$137	RICOH 32x10x40	\$133		
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- CD ROM
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- Refurb 15" Colour Monitor
- 56K Internal Modem
- Win 95 supplied & installed
- 7 Bonus Software Titles
- 1 Month internet up to 300MB

GT3 450MHz



- Intel Pent 450MHz CPU
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- 6.0GB Hard Disk Drive
- CD ROM
- Speakers & Int Sound Card
- Refurb 15" Colour Monitor
- 56K Internal Modem
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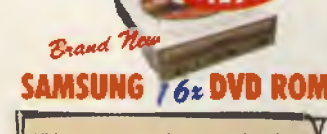
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CANON BJC-600/610/620	16	5-BKL
CANON BJC-2000/4000/4100/4200/4300/4550/5000/5500 BCI-21	45	19-BKL
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CANON BJC-3000/6000/6200/6500/8000 & S400/S500 Ser es	12	46-BKL
CANON BJC-7000/7100 Series - Including Optimiser!	6	43-BKL
CANON BJC-8200 & S800 Series	6	52-BKL
HP Desk Jet 400/500 Series	8	86-BKL
HP Desk Jet 600/650/680 Series	8	88-BKL
HP Desk Jet 700/800/900/1000/1100/1200 Series	8	29-BKL
HP Desk Jet 300 Series & Olivetti JP's!	12	7-BKL
EPSON Stylus 400/600/800+/1000	12	1-BKL
EPSON Stylus Colour /PRO/XL	12	2-BKL
EPSON Stylus 820/colour II/III	12	23-BKL
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	12	33A-BKL
EPSON Stylus Colour 440/460/480/640/660/670/700/720/740/760/900/1160	12	33B-BKL
EPSON Stylus Colour 680/777/778/785/870/880/875/890/1270/1280	12	Please Call!
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CANON BJC-3000/6000/6200/6500/8000 & S400/S500 Series	3x8	47-CLR
CANON BJC-8200 & S800 Series	3x6	53-CLR
HP Desk Jet 300/400/500 Series & Olivetti!	3x12	14A-CLR
HP Desk Jet 600C/600/680C Series	3x12	14B-CLR
HP Desk Jet 650C/650/700C/1000C Series	3x3	30A-CLR
HP Desk Jet 710/720/890/900 Series	3x3	30B-CLR
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EPSON Stylus 820/colour II/III	3x12	24-CLR
EPSON Stylus Colour 200/300/400/500/600/800/850/1520	3x12	34A-CLR
EPSON Stylus Colour 440/460/480/640/660/670/700/720/740/760/900/1160	3x12	34B-CLR
EPSON Stylus Colour 680/777/778/785/870/880/875/890/1270/1280	3x12	Please Call!
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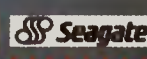
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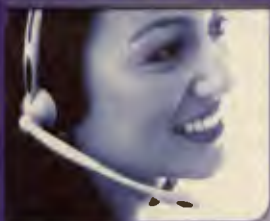
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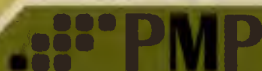
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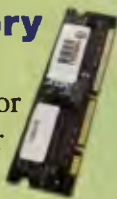
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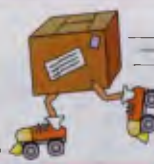
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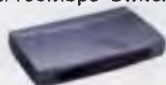
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MAX RESOLUTION	1024 x 768	1024 x 768
POINTING DEVICE	Touch Pad	Touch Pad
CD-ROM/DVD	DVD	DVD
PORT REPLICATION	no	no
VIDEO RAM	16MB	16MB
56k v.90 & 10/100 LAN	yes	yes
WIRELESS LAN	Antenna Ready	Antenna Ready
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HARD DRIVE	30GB	30GB	30GB	40GB
SCREEN	14.1" TFT	14.1" TFT	15" TFT	15" TFT
MAX RESOLUTION	XGA	XGA	XGA	XGA
CD-ROM/DVD	DVD	DVD/CDRW	DVD/CDRW	DVD/CDRW
VIDEO RAM	16MB	16MB	32MB	32MB
56K v.90 & 10/100 LAN	yes	yes	yes	yes
WIRELESS LAN	no	no	no	yes
WARRANTY	1 year	1 year	1 year	1 year
Rent* /wk	\$35.68/wk (F1178)	\$37.79/wk (F1185)	\$40.35/wk (F0782)	\$49.45/wk (F0783)
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MAX RESOLUTION	1024 x 768
CD-ROM/DVD	DVD
PORT REPLICATOR	Optional
VIDEO RAM	16MB Ext
56k v.90	Yes
10/100 LAN	Yes
WIRELESS LAN	Yes
WEIGHT	1.9Kg
WARRANTY	3 Years
Rent* /wk	\$45.72/wk (E3499)
WIN XP PRO/2000	

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FEATURES

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(without camera)

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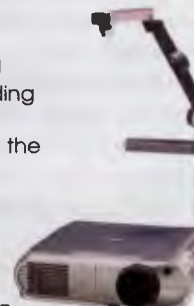
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LAN	Wireless LAN Antenna Only	Yes- 802.11b
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Part #	(F3587)	(F3585)

\$4,289

\$4,989



S6010

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- S-Video Out.



C2010

Model	C2010	C2111
Processor	Pentium 4 1.6GHz-M SS	Pentium 4 1.6GHz-M SS
RAM	256MB SDRAM DDR	256MB SDRAM DDR
HDD	30GB	40GB
Drive	CD-RW	DVD/CD-RW
Screen	14.1" XGA TFT	15" XGA TFT
OS	Microsoft® XP Home	Microsoft® XP Home
Rent* /wk	\$37.75	\$42.47
Part #	(F3997)	(F3999)

\$3,990

\$4,489

LIFEBOOK P1110/P2110 Ultra Portable

The P1110 with the portability of a PDA at only 880g, is a fully-fledged notebook running Microsoft® Windows® XP.

- Integrated V.90 modem and 10/100Mbps Base-T LAN
- The ultra portable LifeBook P2110 boasts the addition of a built-in combo drive for extra flexibility and functionality. P2110 Also Includes:
 - Optical Digital Audio Out (SPDIF)
 - S-Video out.



P1110

Model	P1110	P2110
Processor	Crusoe 733MHz	Crusoe 867MHz
RAM	256MB	256MB
HDD	20GB	30GB
Drive	Ext CD	DVD/CD-RW
Screen	8.9" XGA TFT	10.6" XGA TFT
OS	Microsoft® XP Home	Microsoft® XP Home
Rent* /wk	\$33.63	\$40.58
Part #	(F3594)	(F3592)

\$3,389

\$4,289

Notebooks

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stores but can be
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Compaq Presario 1500AU Notebook

- Intel Pentium 4 2GHz Processor
 - 14 1" XGA+ display.
 - 256MB DDR RAM standard.
 - 20GB UDMA hard drive.
 - ATI 7500 Radeon 32MB Video.
 - 8x 8x 24x 8x CDR-W / DVD Combo drive.
 - USB 2.0 Ports - 40x faster than USB 1.1.
 - Integrated Mini PCI v.92/56K modem and 10/100 ethernet.
 - Integrated JBL Pro Speakers.
 - Microsoft Windows XP Home, MS Encarta, Norton Anti Virus OEM, Roxio Easy CD Creator, WinDVD Player
- Includes 1 year international return to base warranty.*

Rent* \$37.70/wk (F4957)

\$3,799



Compaq Evo N1000v Notebook

- Intel Pentium 4 2GHz Processor
- Convenient all-in-one form factor!
- 14 1" CTFT 1024 x 768 Display, 256MB DDR SDRAM (266MHz).
 - ATI Mobility Radeon 7500 video chipset, 32MB DDR SDRAM, 4X AGP.
 - 20GB Hard Disk Drive, 3.5" 1.44MB Diskette Drive.
 - 8x DVD-ROM Drive
 - Integrated Mini PCI v.92/56K modem and NIC Combo.
 - Microsoft Windows XP Professional.

Rent* \$34.68/wk (F1860)

\$3,495

*Compaq 1 Year Limited
International Warranty,
including pick-up anywhere
in Australia, with a 48-hour
service workshop
turnaround repair time.*



Compaq Evo N800v Notebook

- Intel Mobile Pentium 4 1.7GHz Processor
- Thin and light, from only 2.54kg!
- 15.0" CTFT 1400 x 1050 display, 256MB DDR SDRAM (266MHz).
 - ATI Mobility Radeon 7500 video chipset, 64MB DDR SDRAM, 4X AGP.
 - 40GB hard drive, optional 3.5" 1.44MB Diskette drive.
 - CD-RW / DVD-ROM combo Drive.
 - Integrated Mini PCI v.92/56K modem and NIC combo.
 - Microsoft Windows XP Professional.

Rent* \$42.52/wk (F1846)

\$4,495

*Compaq 1 Year Limited
International Warranty,
including pick-up anywhere
in Australia, with a 48-hour
service workshop
turnaround repair time.*





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Pocket PC & StorageWorks

Compaq iPAQ Pocket PC H3850

No.1 Pocket PC Compaq iPAQ Pocket PC H3850

- 206MHz Intel StrongARM Processor
- Memory: 64MB RAM, 32MB ROM
- Reflective TFT Screen with 65,536 colours. 240 x 320 resolution
- SD expansion slot integrated
- 1400 mAh Lithium Polymer rechargeable battery with up to 12 hours standby (depending on usage)
- Includes: Universal (USB/Serial) Docking Cradle, AC Adaptor
- Microsoft Pocket PC 2002 operating system

Rent* \$12.09/wk (D1797)

\$1,079



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Compaq iPAQ Pocket PC H3970

The No.1 Pocket PC now with inbuilt Bluetooth for wireless communication

- Intel 400MHz X-Scale • 64MB RAM Memory
- 48MB ROM Memory
- Integrated Bluetooth • Increased battery life
- Integrated SD Slot - SD Input/Output Ready
- Ultrabright transreflective TFT screen with 65K colours
- Includes: Universal (USB/Serial) Docking Cradle, AC Adaptor
- Microsoft Pocket PC 2002 operating system

Rent* \$16.80/wk (F4394)

\$1,499

iPAQ Accessories

Compaq Cover Pack
(D9175) **\$45**

Compaq Auto Adapter
(D9174) **\$65**

Compaq Stylus 3 pack
(D9176) **\$35**

Compaq Zippered Leather Case
(E3569) **\$65**

Compaq Universal Cable Serial/USB
(D9171) **\$45**

Compaq StorageWorks™ Compaq StorageWorks Network Attached Storage



The StorageWorks™ NAS S1000 by Compaq is the entry-level Network Attached Storage (NAS) solution that delivers quick and simple NAS storage providing multi-protocol file support and storage management for workgroups, small businesses and remote locations. The S1000 is designed as quick and simple storage that is easy to deploy and manage.

NAS S1000 320GB

- 320GB, 1U high • CIFS, NFS, Netware support
- Windows Powered OS • Dual 10/100 NIC • Gig-E included
- Celeron 566MHz • 384MB SDRAM • On board SCSI for backup.

Rent* \$73.76/wk (E8205)

\$8,287

NAS S1000 640GB

- 640GB, 1U high • CIFS, NFS, Netware support
- Windows Powered OS • Dual 10/100 NIC • Gig-E included
- Pentium III 866MHz • 384MB SDRAM • On board SCSI for backup • Persistent Storage Manager for storage management.

Rent* \$96.34/wk (E8207)

\$11,885



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Complete ProLiant Series Networking Solutions

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Compaq ProLiant ML330 G2

The affordable Server for an Expanding Business!

- Ideal use with file/ print/ internet sharing, email & small databases
- Dual processor capable Intel Pentium III 1266MHz with 133MHz FSB
- 128MB ECC SDRAM (expandable to 4GB)
- 5 available PCI expansion slots (includes 4 x 64 bit PCI slots)
- 40GB Ultra ATA-100 hard drive with integrated ATA RAID or (Ultra3 SCSI and hot plug hard drive optional)
- Includes famous insight manager and SmartStart software suites
- 1 Year Compaq warranty, parts, labour, on site (ask about our upgrades)

Rent* \$21.57/wk (E6123) **\$1,925**

Small Business Budget Bundle

With Software

- 1 x Compaq ProLiant ML330 G2
- 1 x 40Gb ATA Hard Drive
- 128MB ECC 133MHz SDRAM
- 1 x MS Windows 2000 Server Software

Rent* \$33.69/wk (E6124) **\$3,395**

Compaq Services Carepaq Upgrades:

Installation from Microsoft Operating System Application Telephone Support Pack-10 (D6479)

\$1,699

Pack-25 (D6480)

\$4,285

Compaq ProLiant ML350 G2

The Workgroup server that will grow with your business!

- Dual processor capable Intel Pentium III 1266MHz with 133MHz FSB
- 128MB ECC SDRAM (expandable to 4GB)
- 6 available PCI expansion slots (includes 5 x 64 bit PCI slots)
- Integrated dual-channel Ultra3 SCSI
- 6-1" Hot PLUG hard drive bays (expandable to 8),
- Redundant power supply optional
- Includes famous insight manager and SmartStart software suites
- 3 Year Compaq warranty, parts, labour, on site

Rent* \$30.75/wk (D4235) **\$3,099**

Business Work Group Bundle

With Software

- 1 x Compaq ProLiant ML350 G2 1266
- 1 x 532 Raid Controller
- 1 x 128MB ECC 133MHz SDRAM (Extra Ram) 256MB in Total
- 3 x 18.2GB Pluggable Ultra3 10K RPM HDD
- 1 x MS Windows 2000 Server Software
- 1 x Configuration

Rent* \$71.87/wk (E6125) **\$8,075**

Compaq ProLiant ML370 G2

For unprecedented performance and availability!

- Ensures constant uptime with hot pluggable hard drives, cooling fans, PCI slots, and also optional hot plug secondary power supply
- Dual capable Pentium III 1400MHz with 512k cache & 133MHz FSB
- 256MB of 133MHz ECC SDRAM (expandable to 6GB)
- Integrated dual channel Ultra 3 SCSI Controller
- 6-1" hot plug hard drive bays, 6 - 64bit PCI slots
- Includes famous insight manager and SmartStart software suites
- 3 Year Compaq warranty, parts, labour, on site

Rent* \$47.97/wk (E3940) **\$5,199**

Corporate Bundle

With Software

- 1 x Compaq ProLiant ML370 G2 1400
- 1 x Integrated Smart Array 5i w/ BBWC
- 3 x 18.2GB Pluggable Ultra3 10K RPM HDD
- 1 x MS Windows 2000 Server Software
- 1 x Configuration

Rent* \$76.43/wk (E6159) **\$9,115**

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NEW! Compaq Tape Drives

DLT VS 40/80 GB Tape Drive

•Half-height form factor requires only half the space of traditional DLT drives providing customers with more flexibility in high density applications •Requires fewer data cartridges to complete data backup as compared to the DLT 20/40 •100% improvement in performance reduces the backup window for DLT 20/40 customers by as much as 50% •Investment protection through backward-read compatibility with media previously written in DLT 20/40 format •Can be read by StorageWorks SDLT 110/220 and 160/320 tape drives providing for an easy upgrade path to SDLT drives in the future •DLT VS technology roadmap offers future native drive capacities to 160GB.

DLT VS 40/80GB Internal Tape Drive

Rent* \$30.75/wk (F7973) **\$3,099**

DLT VS 40/80GB External Tape Drive

Rent* \$34.29/wk (F7974) **\$3,455**

LTO Tape Drives for ProLiant Servers

•100GB (native), 200GB (2:1) •15MB/s (native), 30MB/s (2:1) •Universal implementation into ProLiant servers from the new hp •Adaptive Tape Speed dynamically matches the transfer rates of slower hosts (from 6MB/s upwards), which increases performance, reduces mechanical wear on the drive and extends tape life •Supports disaster recovery for easy restore from a hard drive failure •Active Head Cleaning •Supported with VERITAS Backup Exec 8.6 and Computer Associates 2000 •Qualified on Microsoft Windows NT 4.0 and Windows 2000. *Additional OS support will be released in the future.

LTO Ultrium 100/200GB Internal Tape Drive (carbon)

Rent* \$78.78/wk (F7985) **\$9,395**

LTO Ultrium 100/200GB External Tape Drive (carbon)

Rent* \$80.03/wk (F7986) **\$9,545**

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hp procurve switch 5300xl Series

Designed to accommodate the most demanding network needs,

the new HP Procurve Switch 5300xl series wire-speed, layer 3 and layer 4 technology at layer 2 prices, making them your best-value layer 3 switches. The Switch 5300xl series combines cutting-edge technology with unparalleled investment protection. Smart, scalable, affordable, and easy to use in a compact, 4- or 8-slot mini-chassis, these convergence ready switches provide flexibility, high port density, free software upgrades, and a lifetime warranty.

J4849A hp procurve switch 5348xl

4-slot Layer 3 access switch, 36.6Gbps backplane, 24 mpps, pre-configured with 48 10/100 ports.

Rent* \$76.93/wk (E8120)

\$9,175

hp procurve
switch
5348xl

J4848A hp procurve switch 5372xl

8-slot Layer 3 access switch, 76.8Gbps backplane, 48 mpps, pre-configured with 72 10/100 ports.

Rent* \$112.27/wk (E8121)

\$13,850

hp procurve
switch
5372xl



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hp procurve switch 408

Unmanaged 8 port 10/100 switch in a compact sized package. This switch offers half/full duplex, 10/100 autosensing on every port. Warranty: Lifetime, Exchange Next Day

(C9017)

\$385

hp procurve switch 2312 & 2324

Ideal for low-cost, unmanaged 10/100 connectivity

- Lowest Price hp 10/100 Switch • Includes 2 Built-in Gigabit transceiver slots • Brings 10/100/1000 solutions to the market • Media-flexible ports for uplinks and server connections • HP quality, functionality and performance • Plug and play solution



procurve switch 2312

(12 port unmanaged switch)

Rent* \$11.19/wk (B0063)

\$999

procurve switch 2324

(24 port unmanaged switch)

Rent* \$16.75/wk (B0064)

\$1,495

hp procurve switch 2512 & 2524

9.6GB PS BACKPLANE & AUTO-MDIX • Lowest Price 10/100 Managed Switch • Provides a rich, layer 2 feature set • Includes 2 transceiver slots for upgrade to a gigabit • Auto MDIX on all 10/100 and 100/1000 ports • Lifetime warranty for as long as you own the product • Wire-speed performance on all ports • FREE HP TopTools Management Software included.



procurve switch 2512

(12 port managed switch)

Rent* \$19.04/wk (A9703)

\$1,699

procurve switch 2524

(24 port managed switch)

Rent* \$24.60/wk (B0062)

\$2,195

hp server tc2100 Series

P5498A hp server tc 2110

P4 1.7GHz 18GB SCSI Model 18

Features

- Intel Pentium 4 1.7GHz
- 128MB SDRAM
- 256KB L2 cache
- 48x CD-ROM
- 18GB Ultra3 SCSI HDD
- FDD, single-channel Ultra 3 SCSI controller
- 10/100TX LAN, 6 shelves
- 2 full-length PCI slots
- startup CD & toptools for servers

- Warranty: 3 year Next Day, Onsite



Rent* \$22.36/wk

(E6980) **\$1,995**

Image for illustration purposes only.

P5499A hp server tc 2110

P4 1.7GHz 40GB IDE Model 40

Features

- Intel Pentium 4 1.7GHz,
- 128MB SDRAM
- 256KB L2 cache
- 48x CD-ROM
- 40GB Ultra ATA IDE HDD,
- FDD, dual-channel UATA/33/66/100 IDE controller
- 10/100TX LAN, 6 shelves
- 3 full-length PCI slots
- startup CD & toptools for servers

- Warranty: 3 year Next Day, Onsite



Rent* \$18.99/wk

(E6978) **\$1,695**

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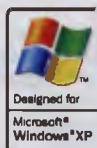
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Monitor not included

Ipex have a full range of Windows® XP ready PCs. Take advantage of Microsoft's new Operating system with a new PC from Ipex. Choose from Windows® XP Home or Professional Editions for home or business.



Internet keyboard optional upgrade.



Ipex recommends
Microsoft® Windows® XP.

IPEX FOR HOME

Form Factor	T200 Tower	T400 Tower
Processor	Intel® Celeron® 1.8GHz	Intel® Pentium® 4 2.0 GHz
HDD	40GB @ 7200RPM	60GB @ 7200RPM
RAM	128MB DDR	256MB DDR
LAN	Onboard	Onboard
Video	Onboard	64MB
Sound	Onboard	GF 4 MX440
CD-ROM	CD-RW	DVD-ROM/ CD-RW
Modem	None	None
Warranty	3 Years RTB	3 Years RTB
OS	Windows® XP Home	Windows® XP Pro
Software	Works 6.0	Office XP SBE
Rent*	\$16.80/wk	\$26.78/wk
Part #	(F4955)	(F8311)
	\$1,499	\$2,699

Monitor not included: choose one from the options below!

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The Ipex Series Slim Office Desktop is ideal for business and corporate environments. Housed in a small form factor Slim Office Case, it features Integrated LAN, Graphics and Audio onboard.

IPEX FOR BUSINESS

Form Factor	Slim Office	Slim Office	Micro Office
Processor	Intel® Celeron® 1.4 GHz	Intel® Celeron® 1.7GHz	Intel® Pentium® 4 2.0 GHz
HDD	20 GB @ 7200RPM	20 GB @ 7200RPM	20 GB @ 7200RPM
RAM	128 MB SDRAM	128 MB DDR	256 MB DDR
LAN	Onboard	Onboard	Onboard
Video	Onboard	Onboard	Onboard
Sound	Onboard	Onboard	Onboard
CD-ROM	CD-ROM	CD-ROM	CD-ROM
Monitor	None	None	None
Warranty	3 Years RTB	3 Years RTB	3 Years RTB
OS	Windows® XP Pro	Windows® XP Pro	Windows® XP Pro
Software	none	Office XP SBE	Office XP SBE
Rent*	\$15.68/wk	\$20.16/wk	\$23.52/wk
Part #	(F8307)	(F8308)	(F8309)
	\$1,399	\$1,799	\$2,099

Upgrade your IPEX PC to the following Microsoft software suites

Microsoft® Works Suite 2002

• Word 2002 • Encarta Standard 2002
• Money 2002 • Picture It! Photo 2002

Microsoft® Office XP Small Business Edition

• Word 2002 • Excel 2002 • Outlook 2002
• Publisher 2002

Microsoft® Office XP Professional

• Word 2002 • Excel 2002 • Outlook 2002
• Publisher 2002 • Access 2002

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IPEX CRT & LCD FLAT SCREEN MONITORS

IPEX 15" CRT



(C5931)

\$289

17" CRT

(D9301)

\$349

IPEX 15" LCD



Rent* \$10.63/wk
(C9400)

\$899

IPEX 17" LCD



Rent* \$16.24/wk
(C9401)

\$1,449

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Ipex- NEW Notebooks & Servers

Ipex - ASUS L2000 Series Notebook

The Ipex-ASUS L2000 Notebook combines the processing power of the Mobile Intel® Pentium® 4 processor with the Intel® 845 MP chipset to boost application performance and deliver outstanding graphics capabilities. The L2000 notebook is the ideal desktop PC replacement.

Features:

- New generation Mobile Intel® Pentium® 4 processor combined with a Mobile Intel® 845 chipset delivers enhanced processing power to meet the most demanding business requirements.
- Up to 1GB DDR memory support provides the necessary bandwidth and capacity for graphics and processor- challenging applications.

- ATI Radeon 7500 video chipset provides a complete, dedicated graphics solution with revolutionary performance.
- 16MB of 128bit dedicated DDR memory.
- Powerplay™ power management technology optimises graphics power consumption to improve battery life.
- Microsoft® Windows® Extended Desktop supports large screen display.

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NEW



L2000 Model
Pictured
(E7416)

IPEX NOTEBOOKS

Model	M2400	L2000
Processor	Intel® Celeron® -M 1.13GHz	Intel® Pentium®4 -M 1.6GHz
HDD	20GB	20GB
RAM	128MB	128MB DDR
LAN	10/100 Ethernet	10/100 Ethernet
Sound	Onboard	Onboard
CD-ROM/DVD	Yes	Yes
Modem	Inbuilt V.90 56k	Inbuilt V.90 56k
Port Replicator	Optional	Optional
Video RAM	up to 32MB	16MB DDR
Screen	14.1 XGA LCD	14.1 XGA LCD
Resolution	1024 x 768	1024 x 768
Warranty	2 Years RTB	2 Years RTB
OS	Windows® XP Pro	Windows® XP Pro
Rent*	image not shown \$33.73/wk	\$36.71/wk
Part #	(E7417) \$2,995	(E7416) \$3,349

Ipex recommends
Microsoft® Windows® XP.

IPEX- RACK MOUNT SERVERS

Model	C220 1U	C460 2U
Form Factor	1U Rack Mount	2U Rack Mount
Processor	C220RM 1U Server Pentium® III 1.13GHz (Dual Capable)	C460-RM-T 2U Server Pentium® III 1.26GHz (Dual Capable)
HDD	18GB SCSI U160 HDD	18GB SCSI U160 HDD
RAM	128MB SDRAM	256MB SDRAM
LAN	Dual 10/100 Ethernet	Dual 10/100 Ethernet
Video	Onboard	Onboard
Sound	Onboard	Onboard
CD-ROM	Yes	Yes
SCSI/RAID	Dual Channel U160 SCSI Ctrl	Dual Channel U160 SCSI Ctrl
Warranty	3 Years Onsite	3 Years Onsite
OS	Windows® 2000 Server + 5 CALS	Windows® 2000 Server + 5 CALS
Rent*	\$47.88/wk	\$54.25/wk
Part #	(E8107) \$5,189	(E8108) \$5,879



Ipex C220 1U
(E8107)



Ipex C460 2U
(E8108)

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Collect 5,000 Bonus Fly Buys points when you purchase E7416 between 20/08/02 - 30/09/02

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USB Storage Device

MICRO VAULT

Plugs directly into a USB Port, Plug and Play interface, Security Zone software allows password protection of data, when using Windows 2000 & XP.

USM16 - 16MB RAM (E4136) **\$99**

USM64 - 64MB RAM (E4141) **\$199**

USM32 - 32MB RAM (pictured) (E4140) **\$139** **USM128** - 128MB RAM (E4142) **\$289**



SONY

Rechargeable Battery Pack



BCG34HNB2

- Charges Batteries in 1 Hour
- Ideal for Digital Products
- For AA or AAA Batteries
- Auto charge cut off
- For NiMH or NiCD Batteries
- Two AA Rechargeable Batteries Included

(F8314)

\$66

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Digital Still Cameras Cyber-shot MEMORY STICK



DSCP51 - 2.0 Mega Pixel, 2x Optical, 6x Precision Digital Zoom, MPEG Movie HQX, E-Mail Mode, Intelligent Flash (Red-Eye Reduction), White Balance (Auto, Daylight, Cloudy), USB Interface.

Rent* \$7.56/wk (F1233) **\$675**

DSCP7 - 3.2 Mega Pixel, 3X Optical (6X Digital) Zoom, 1.5" LCD Screen, MPEG Movie EX, ISO Sensitivity Setting, AF Illuminator, USB.

Rent* \$13.97/wk (F8241) **\$1,247**

DSCP31 - 2.0 Mega Pixel, 3X Digital Zoom, 1.6" LCD Screen, MPEG Movie HQX, Clip Motion, NiMH Battery System, USB.

Rent* \$6.44/wk (F1093) **\$575**

DSCP71 (pictured) - 3.2 Mega Pixel, 3x Optical, (6x Digital) Zoom, 1.5" colour LCD MPEG Movie HQX, ISO Sensitivity Setting, AF Illuminator, USB.

Rent* \$10.48/wk (E7751) **\$935**

Video Cameras MEMORY STICK



DCRTRV18 - MiniDV Handycam, Carl Zeiss Lens, Memory Stick Slot, USB Streaming, MPEG Movie Mode, Advanced HAD Technology, 2.5" LCD Monitor.

Rent* \$18.71/wk (F5209) **\$1,670**

DCRTRV340 - Digital 8 Handycam, 25x Optical Zoom, Memory Stick Slot, USB Streaming, MPEG Movie Mode, Electronic Steady Shot, Super Night Shot.

Rent* \$16.64/wk (F5211) **\$1,485**



LCD Monitors

Monitors include Sony 3 Year Warranty.

SDMS51

- 15" XGA Display
- 300:1 Contrast Ratio
- 0.297mm Pixel Pitch
- Max Res: 1024 x 768 @ 75Hz

Rent* \$11.85/wk

(E7756) **\$1,058**

SDMS71

- 17" SXGA Display
- 350:1 Contrast Ratio
- 0.264mm Pixel Pitch
- Max Res: 1280 x 1024 @ 85Hz

Rent* \$19.33/wk

(F7881) **\$1,725**

SDMS81

- 18" SXGA Display
- 400:1 Contrast Ratio
- 0.279mm Pixel Pitch
- Max Res: 1280 x 1024 @ 85Hz

Rent* \$27.56/wk

(E7757) **\$2,777**



AIT Back-Up Kit



AIT 1A Back-Up Kit, 35-90GB	External	Rent*\$29.27/wk	(C7478)	\$2,950
	Internal	Rent*\$24.59/wk	(C7480)	\$2,478
AIT 2 Back-Up Kit, 50-130GB	External	Rent*\$44.41/wk	(E1027)	\$4,694
	Internal	Rent*\$41.09/wk	(E1026)	\$4,343
AIT 3 Back-Up Kit, 100-260GB	External	Rent*\$76.79/wk	(E1030)	\$9,158
	Internal	Rent*\$73.58/wk	(E1029)	\$8,267

All kits packaged with cables, media and software. Includes 3 Year on-site Warranty

SONY

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*The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.

Prices are subject to change. Check here for latest prices & products!!

Web Direct
www.ht.com.au/cat/sony

Power, Mobility & Versatility for Home and at Work

PCGFX990

Rent* \$32.74 /wk (D4414)

\$3,299



- Pentium III 1GHz-M
- 15" XGA Display
- 256MB RAM
- 20GB HDD
- XP Home Edition
- USB & i.LINK interface
- CD-RW/DVD Combo Drive
- Modem & Network

PCGGRX3P

Rent* \$48.90/wk

(F8191) **\$5,299^{RRP}**

NEW



- Pentium 4 1.6GHz-M
- 16.1" UXGA Display
- 256MB RAM
- 40GB HDD
- XP Professional
- USB + i.LINK interface
- CD-RW/DVD-Combo Drive
- Modem & Network

PCGR505MP

Rent* \$48.90/wk (F3952)

\$5,299



- Pentium III 1.2GHz-M
- 12.1" XGA Display
- 40GB HDD, 256MB RAM
- Modem & Network
- XP Professional
- USB + i.LINK interface
- CD-RW/DVD-Combo Drive
- Lightweight: 1.95kg

PCGC1MT

Rent* \$37.83/wk (E2395)

\$3,999



- Built-in Camera
- 8.9" SXGA Display
- MagicGate Memory Stick Slot
- Internal Modem
- XP Home Edition
- i.LINK Interface
- Port Replicator supplied
- Lite Weight: 995g

Clie, greater versatility to keep the mobile professional entertained & informed

PEGNR70VG

- Keyboard embedded in PDA
- Built in Camera
- Flip rotatable LCD Display
- Audio Controller & Headphones supplied
- 320 x 480 Colour Display
- MagicGate Memory Stick Slot
- World Alarm Clock
- Remote Controller



MAGICGATE

Rent* \$15.12/wk (F0918)

\$1,349

PEGT665CG

- Ultra Slim Style
- Built-in ATRAC3 & MP3 Audio Player
- 320 x 320 Colour Display
- Headphones supplied
- MagicGate Memory Stick Slot
- World Alarm Clock
- Remote Commander
- PictureGear Pocket



MAGICGATE

Rent* \$10.07/wk (F5201)

\$899

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

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*Delivery charges apply

VAIO
Software included with Notebooks:

- Norton AntiVirus 2002
- Adobe Photoshop Elements
- Apple Quicktime
- Adobe Acrobat Reader
- Movie Shaker
- PictureGear
- DVgate
- SonicStage
- VisualFlow
- PictureToy

*Notebook Part No:
(F3952), (F8191)
(D4414), (E2395)



Collect 500 Bonus Fly Buys points when you purchase F5201. OR collect 1,000 Bonus Fly Buys points when you purchase F0918 between 20/08/02 - 30/09/02

NO FURTHER DISCOUNTS AVAILABLE ON...

ALL SONY NOTEBOOKS & ACCESSORIES SOLD FROM **HARRIS TECHNOLOGY.**

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Quantum

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Quantum's New SuperLoader Data Storage

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
HARRIS TECHNOLOGY
*Delivery charges extra.

SuperLoader

- DLT1 - 640GB capacity @ 3MB/sec transfer rate
- SDLT - 1.76TB capacity @ 11MB/sec transfer rate (above are native figures. 2:1 compression is achievable)
- Choice of drives for value or performance
- Huge performance/capacity upgrade path
- Single cartridge mailslot allows removal of cartridges without system interruption
- Web based management tools allows control and monitoring from remote location
- Optional barcode reader for non-sequential tape management
- 1 million MCBF



DLT1 Rent* \$134.56/wk (F1234)

SDLT Rent* \$217.18/wk (F1235)

\$16,725
\$26,995

The new Quantum SuperLoader™ quickly stores up to 3.5TB in only 2U. It also features up to 16 DLTape™ cartridges, sophisticated on board remote management tools and convenient ways to import and export cartridges. For more information, visit www.quantum.com/superloader

MONSTROUS CAPACITY

Tiny Footprint

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The figures quoted are based on a per week basis over 3 years. T.A.P. Terms & Conditions apply.

The Broadest Line-up of Network Attached Storage

Snap Server 4100

- 480GB 400GB or 240GB of Network Attached Storage (NAS)
- 5-minute installation
- High-density 1U format fits standard 19" racks or easily stacks on tabletops
- RAID 5, 1, 0
- Automatically recognises and supports all major network platforms
- 100Base-TX/ 10Base-T Ethernet connectivity
- SNMP support for centralised management - can also be managed remotely via Web browser
- Very low total cost of ownership.

240GB Rent* \$55.51/wk (A8119) **\$6,015**

400GB Rent* \$70.79/wk (D1207) **\$7,953**

480GB Rent* \$77.68/wk (F1231) **\$9,265**



Snap Server 12000

- 960GB of Network Attached Storage (NAS)
- Less than a 15-minute installation
- Compact 3U rack-mountable form factor
- Hot-swappable drives
- Dual redundant hot-swappable power supplies and cooling fans
- RAID 5, 1, 0
- Automatically recognises and supports all major network platforms
- Gigabit/ 100Base-TX/10Base-T Ethernet connectivity
- SNMP support for centralised management
- Very low total cost of ownership.

960GB (C9169) **\$33,640**



Snap Server 1100

- 80GB or 40GB of Network Attached Storage (NAS)
- Five minute installation
- Compact, portable easily fits in a briefcase, on a shelf or on a tabletop
- Automatically recognises and supports all major network platforms
- 100Base-TX/10Base-T Ethernet connectivity
- SNMP support for centralised management - can also be managed remotely via Web browser
- Very low total cost of ownership.

40GB Rent* \$16.23/wk (E4199) **\$1,448**

80GB Rent* \$22.81/wk (E4200) **\$2,299**



Snap Server 2200

- 160GB of Network Attached Storage (NAS)
- Five minute installation
- Compact, stand alone unit easily fits on a shelf or tabletop
- RAID 1, 0
- Automatically recognises and supports all major network platforms
- 100Base-TX/ 10Base-T Ethernet connectivity
- SNMP support for centralised management - can also be managed remotely via a Web browser
- Very low total cost of ownership
- Network UPS support.

160GB Rent* \$37.30/wk (D1208) **\$3,759**

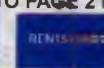
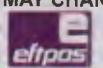


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for all your computer needs!

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Next Generation Backup Solutions

The LoaderXpress is a family of autoloaders which combine the latest drive technology with field-proven and award winning robotics first introduced by Overland. This line is an excellent entry point for users who require tape automation on a modest budget. LoaderXpress products support the LATEST in tape technology.

LoaderXpress

- DLT1, DLT8000, SuperDLT - up to 1.1TB, 10 Cartridges
- LTO Ultrium - up to 1.1TB, 11 Cartridges
- AIT-1 - 665GB, 19 Cartridges, 1 drive, upgradeable to 2 (AIT-1)



PowerLoader

LXM1B115TB Single DLT1 Tape Drive

Rent* \$114.53/wk (F3168) **\$14,129**

LXM8115TB Single DLT8000 Tape Drive

Rent* \$117.77/wk (F3171) **\$14,529**

LXM1S115TB Single SuperDLT 220 BRC Drive

Rent* \$201.12/wk (F3175) **\$24,999**

A standalone library that is also scalable up to 17.1TB and up to 18 drives offering high performance and data storage growth. The AIT LibraryPro is the first modular library available in the market using the AIT drive technology.

AIT LibraryPro

- AIT-2, AIT-3 drives - 950GB, 19 Cartridges
- 1 or 2 drives - field-upgradeable and stackable

LP2L119TB Single AIT-2 Tape Drive

Rent* \$125.60/wk (F3177) **\$15,495**

LP3L119TB Single AIT-3 Tape Drive

Rent* \$163.07/wk (F3179) **\$20,269**

The Neo series is the newest library family from Overland and it provides unprecedented levels of availability through Non-Stop Operation, investment protection through SmartScale Architecture, and flexible connectivity to direct attach or SAN environments through Virtual Interface Architecture.

Neo Series 2000

- DLT8000, SuperDLT, LTO Ultrium - up to 4.2TB
- 1 or 2 drives - field-upgradeable
- 26 (DLT8000, SDLT) or 30 (LTO) cartridges



LXN2126T8L Single DLT8000

Tape Drive Rent* \$185.75/wk

(F3180) **\$23,088**

LXN2126T1SL Single SDLT220

Tape Drive Rent* \$224.58/wk

(F3182) **\$27,915**

LXN2126T2SL Single SDLT320

Tape Drive Rent* \$220/wk

(F4315) **\$27,345**

LXN2130T1UL Single LTO

Ultrium Tape Drive Rent* \$233.11/wk

(F3185) **\$28,975**

Distributed Robotic Architecture provides industry's first scalable data storage library with remote browser accessible library management and Optional fibre channel interface.

SuperDLT Tape Drives: Quantum manufactured



DLT220/S Int 110/220GB

Rent* \$68.52/wk (B9821) **\$7,698**

DLT220/ST Ext 110/220GB

Rent* \$71.16/wk (B9823) **\$7,995**

DLT320/S Int 160/320GB

Rent* \$79.53/wk (F3197) **\$9,485**

DLT320/ST Ext 160/320GB

Rent* \$82.16/wk (F3198) **\$9,799**

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

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*Delivery charges extra.

MEDIA

DLT Tape Media IIIXT 15/30GB Tape

(68362) **\$79**

DLT Tape IV Media 20/80GB

(71231)

\$137

DLT Cleaning Tapes

(97851) **\$79**

Super DLT Media 110/220 GB

(B9825)

\$243

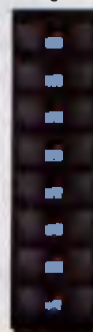
LTO Ultrium 100/200 GB

Tape (D1500)

\$223

Neo Series 2000 System

- up to 33TB
- up to 16 drives
- up to 240 cartridges



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- ☐ Extend to a total of 3 Years Return to Base
- ☐ Extend to a total of 5 Years Return to Base
- ☐ Upgrade Return to Base of Warranty Extension to On-Site

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TECHNOLOGY™

Maxtor DiamondMax D540X

Drives offer outstanding capacity, reliability and value. They feature up to 160 gigabytes of data storage and Ultra ATA/133 data transfer performance.

120GB	(E0564)	\$379
160GB	Rent* \$7 5/wk (E 5)	\$629



DiamondMax
D540X

Maxtor DiamondMax Plus D740X

For power users in e-commerce, online gaming, and MP3, Maxtor DiamondMax Plus D740X hard disk drives set the industry standard for capacity, performance and acoustics.

20GB	(E0566)	\$169
40GB	(D8030)	\$179
60GB	(E0567)	\$219
80GB	(F0611)	\$259



DiamondMaxPlus
D740X

Maxtor Atlas™ 10K III

Disk Drives provide outstanding performance for data-intensive storage environments, with a 10,000 RPM rotational speed and a 4.5 millisecond (ms) seek time.

They feature the high speed, industry-leading Ultra160 SCSI interface—and Maxtor's Shock Protection System III (SPS III) for superior shock durability and reliability.

36.7GB	Rent* \$6.71/wk (D4615)	\$599
73GB	Rent* \$14.86/wk (D5940)	\$1,326



Atlas 10K III



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Make Movies at Home - Easy!



Maxtor®

Maxtor DV Producer™ is one of the easiest ways to turn your home videos into Hollywood-style movies. Regardless of your skill level, the flexible, easy-to-use software will let your creativity soar with artistic templates, realistic special effects, professional transitions and titling, and multiple audio tracks. Everything you need is included in this kit: A. Maxtor FireWire™ (1394/i.LINK™) card, B. Camcorder cable, C. ArcSoft™ ShowBiz™ video editing software. Make spectacular movies in three easy steps:

Making Movies Like a Professional!

Designed for beginning and advanced users. Windows® Compatible

FEATURES:

- Easy editing software
- Add special effects
- Easy installation
- Complete kit

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Now you're making movies like a professional!

FIREWIRE CARD

A.

CABLE

B.

SOFTWARE

C.

***DV Producer**

(E4197)

\$179

Maxtor Personal Storage

FireWire



Maxtor Personal Storage 3000DV/80GB
Ideal for speed-intensive applications such as editing digital video, playing games, and listening to music. The 3000DV features the Maxtor award-winning 7200 RPM hard drive—up to 56% faster than 5400RPM external hard drives.

Rent* \$8.95/wk

80GB (E4068) **\$799**

FireWire



Maxtor External Storage 3000XT/160GB
With the highest capacity maxtor offers, this is the perfect external storage solution for today's storage-hungry digital entertainment equipment. Run applications, edit videos, listen to music, download files, or play games, or store all your important documents and precious memories.

Rent* \$10.07/wk

160GB (E4067) **\$899**

USB 2



Maxtor Personal Storage 3000LE/40GB/120GB
Instantly add storage for your digital photos, videos, MP3 songs, games, and important electronic files. The USB 2.0 interface is up to 40 times faster than USB 1.1. The 3000LE is compatible with virtually all existing USB ports—offering connectivity for today's systems and speed for tomorrow's technology.

40GB (E4064)

Rent* \$7.83/wk 120GB (E4065)

\$399
\$699

RENTWARY

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Belkin Surge & UPS

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

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Surge Cube

The SurgeCube™ allows electronic device to be protected from over voltages.

(D5966)

\$25

Master Cube

The Belkin MasterCube™ protects electronic device and one phone line from over voltages.

(D5956)

\$35

Cases



FON Laptop Case - Silver

(F0822)

\$89



Executive Leather Case.

(F0827)

\$238



Aeropack.

(F0824)

\$108

UPS SERIES

Regulator PRO Silver Series



Features:

- 2 Year Unlimited Product Warranty
- 175 Joule Energy Rating
- 3 Battery Back Up/Surge Sockets
- 1 Surge Protection Only Socket
- Power Management Software Included
- 1.83m Power Cord
- Telephone/Fax/Modem and UTP (RJ45) Protection
- 1.83m Telephone Cable
- RS-232 Communication Cable
- EMI/RFI Filtration

350VA

F6C350zSER-SB
(192 Watts)

(C9277)

\$189

500VA

F6C500zSER-SB
(300 Watts)

(C9278)

\$249

650VA

F6C650zSER-SB
(360Watts)

(C9279)

\$329

Surge control is important because even small surges or spikes can eventually destroy or affect the performance of expensive electronic equipment such as a computer, phone, fax, TV, VCR, stereo or microwave. Damage can occur either instantaneously or over time as smaller surges cause the gradual deterioration of internal circuitry, to voltage fluctuations.

No Hassle Warranties Belkin offer the best Connected Equipment warranties in the business. Full warranty protection means your equipment is insured against damage due to power disturbances of all kinds - surges, spikes, even lightning strikes.

Connected Equipment Warranty up to \$25,000.

Home Office Range

F5C205z2
Belkin's SurgeMaster line has been designed to protect entry-level computers, dot matrix printers, personal copiers and all other sensitive electronics in the home or office.

5 sockets

Special Bundle

Purchase this Surge Master and get a Free Single Surge Cube worth \$25

(F4128) **\$49**

Connected Equipment Warranty up to \$50,000

Superior Grade

F5C206z2
Pentium III computers, audio/video equipment and office equipment need extra protection.
• 6-way Superior Grade range

Blocked space adaptors

AC Line protection

(C4604) **\$105**

Connected Equipment Warranty up to \$80,000

Maximum Grade

F5C208z2
Maximum Grade series ideal for business computers, ADSL and cable modems, high-end printers and copiers, and sensitive audio/video equipment such as satellite receivers and home cinema systems.

8 sockets
39,000 Amps of AC protection

(C4607) **\$135**

Belkin - KVM Switches

Over One Million Belkin KVM units sold World wide!



F1DB102P Economy 2 Port KVM Switch - PS/ 2 (D3162) **\$84**



F1DB104P Economy 4 Port KVM Switch - PS/ 2 (D3159) **\$175**



F1DS102P SOHO 2 Port KVM Switch - PS/ 2 (D3163) **\$289**



F1DS104P SOHO 4 Port KVM Switch - PS/ 2 (D3166) **\$369**



F1DS102T SOHO 2 Port KVM Switch - PS/ 2 & USB (D3165) **\$299**



F1DS104T SOHO 4 Port KVM Switch - P/S 2 & USB (D3167) **\$385**



F1DA104Tz Pro 2 4-Port KVM Switch - PS/ 2 & USB (E5376) **\$509**



F1DA108Tz Pro 2 8-Port KVM Switch - PS/ 2 & USB (E5377) **\$735**



F1DA116Tz Pro 2 16-Port KVM Switch - PS/ 2 & USB (E5378) **\$1,019**

F1DM216Tz Matrix 2 x 16 Port KVM Switch - PS/ 2 & USB (E5380) **\$1,358**

Rent* \$8.23/wk

Rent* \$11.42/wk

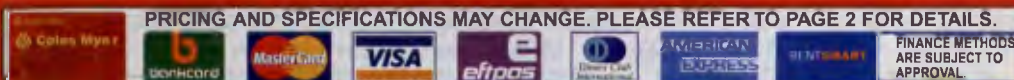
Rent* \$15.22/wk

Don't forget to include your Belkin All-In-One cables The easiest & neatest way to connect all your computers and servers to your PS/2 & USB KVM switches, providing image clarity for high-resolution applications.

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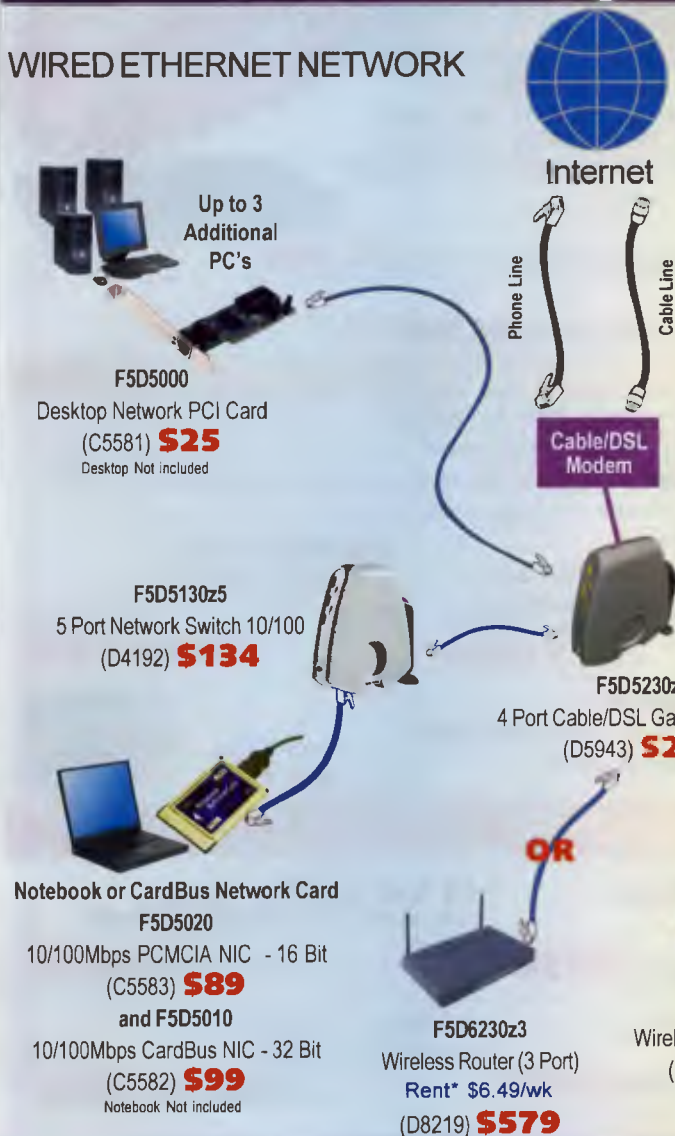
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Belkin Networking Solutions

WIRED ETHERNET NETWORK



WIRELESS NETWORK



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F8Q1000
USB iPAQ Sync Charger
Suitable for iPAQ 3700 Sync Series & Below.
(D5952) **\$37**

F8Q2000
USB iPAQ Sync Charger
Suitable for iPAQ 3800 Sync Series.
(E4744) **\$37**

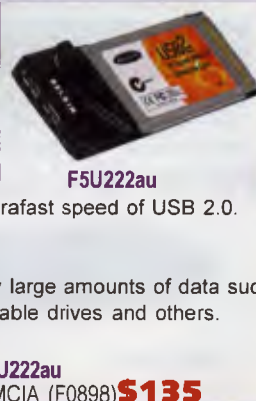
F8E780

Stylus Pen
Belkin 4-in-1 Stylus Pen.
(C4694) **\$35**

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Technology Centre Shoppers!
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USB 2.0 Products - 40 X Faster than USB 1.1

USB 2.0 Upgrade Kit



- Instantly upgrade your computer to the ultrafast speed of USB 2.0.
- Include Belkin cable.
- Transfer Up to 480Mbps.
- USB 2.0 is ideal for transferring extremely large amounts of data such as real-time video cameras, scanners, portable drives and others.
- Compatible USB 1.1 spec devices

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Business Solutions

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Network Cards

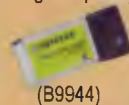
FA 311
Ethernet Adapter
10/100Mbps PCI
(A1372)

\$32

FA 312
10/100Mbps Wake on Lan Ethernet Adapter
(A1373)

\$42

FA 411
10/100Mbps PC Card (No dongle required)



(B9944)

\$125

FA511
10/100Mbps CardBus PC Card (No dongle required)
(D4112)

\$128



GA 302T
32 bit PCI Gigabit network card
(D4118)

\$135

GA 622T
32/64 bit PCI Gigabit network card
(B9943)

\$275

Managed Solutions

NETGEAR's Layer 2 non-blocking managed switches boost small business networks with 24 10/100 ports, 2 stacking ports, and 2 gigabit ports - use built-in Copper Gigabit or GBIC slots. Management includes SNMP, RMON, VLAN, QoS, port trunking, Spanning Tree, and port mirroring. All ports are auto-negotiating and support Auto Uplink™ technology.

FSM 726S

Managed 24 port 10/100 switch with 2 stacking ports and 2x GBIC slots Rent* \$23.48/wk (D8885) **\$2,095**

GSM 712

Managed 10 port 10/100/1000 switch with 2x GBIC slots Rent* \$46.09/wk (F4112) **\$4,995^{RRP}**



Gigabit Solutions

Give your office network a megabooost of speed and capacity. Ideal for combining 10, 100, and 1000Mbps devices, these unmanaged switches feature 10/100/1000 automatic speed and full/half-duplex sensing plus Auto Uplink™ on every port. Users can take advantage of ability to deliver large amounts of multimedia, image, and video information in no time at all. Use it as a robust and reliable network backbone for your company.

GS104

4 port 10/100/1000 gigabit ethernet switch Rent* \$15.68/wk (F7306) **\$1,399**



FS 517TS

1 port 100/1000Mbps and 16 port 10/100Mbps stackable switch (copper) Rent* \$16.30/wk (C2299) **\$1,455**

GS516T 16 port 10/100/1000 Mbps Gigabit Switch.

Rent* \$36.61/wk (D5960) **\$3,689**

GS 508T

8 port 10/100/1000Mbps Gigabit switch Rent* \$23.07/wk (B9916) **\$2,325**

GS524T

24 port 10/100/1000 Mbps Gigabit Switch Rent* \$44.42/wk (D5961) **\$4,695**



Switches

FS 105



FS 105 5 port 10/100Mbps auto-sensing switch (84722) **\$138**

FS 524



FS 108 8 port 10/100Mbps auto-sensing switch (70905) **\$214**

FS 116 16 port 10/100Mbps auto-sensing switch (A5347) **\$399**

FS 516 16 port 10/100Mbps auto-sensing and internal PSU/Vista Rent* \$7.38/wk (60522) **\$659**

FS 524 24 port 10/100Mbps auto-sensing switch Rent* \$9.24/wk (77549) **\$825**

FS 524S 24 port 10/100Mbps auto-sensing switch - stackable Rent* \$16.19/wk (B6540) **\$1,445**

Modular Solutions

Connect with copper or fibre Gigabit. Link up to high-speed servers, connect switches, and combine fibre and copper networks. Two module bays on NETGEAR's FS700 series Modular Fast Ethernet Switches give you extraordinary upgrade flexibility. These non-blocking 19" units provide 24 or 48 10/100Mbps, auto-sensing ports with Auto Uplink™ support.

FS726 24 Port 10/100Mbps, 2 Module slots



Rent* \$12.61/wk (D0873) **\$1,125**

FS750 48 Port 10/100Mbps, 2 Module slots



Rent* \$24.60/wk (D0874) **\$2,195**

AG711T

Copper module Rent* \$7.38/wk (D0921) **\$659**

AG711F

Fibre module Rent* \$10.41/wk (D0924) **\$929**

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FINANCE METHODS ARE SUBJECT TO APPROVAL



NETGEAR™

Prices are subject to change. Check here for latest prices & products!!

Web
Direct

www.ht.com.au/cat/netgear

Wireless

These plug and play devices enable homes and businesses, even those without network IT staff, to deploy and maintain wireless networks easily and reliably. The new 802.11a solution transfers data at 54Mbps and 72Mbps in turbo mode for more efficient downloads of high-bandwidth applications. Perfect for the corporate user or power user whilst the 802.11b is an affordable solution for the small office or home office.

Home/Small
Office
Solutions

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

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*Delivery charges extra

802.11b Products -11Mbps



MA 311
802.11b integrated
PCI Adapter
(F4339) **\$195**



MA 101
11Mbps
Wireless USB
Adapter
(C7110) **\$219**



MA401
11Mbps PCMCIA
Card
(C8117) **\$175**



MA701
11Mbps Type I/II
Compact Flash
Card
(E5891) **\$229**



ME102
11Mbps Wireless
Access Point
(B9929) **\$429**



MR 314 11Mbps
Cable/DSL router
with integrated 4 port
10/100Mbps switch &
built in access point
Rent* \$6.27/wk (C5223) **\$560**

802.11a Products -54Mbps

HA 311
54Mbps Wireless Integrated
PCI Adapter



(F4341) **\$399**

HR 314
54Mbps Cable/DSL Wireless
Router



Rent* \$13.43/wk
(F4342) **\$1,199**

HE 102
54Mbps Wireless Access Point



Rent* \$10.74/wk
(E5824) **\$959**

HA501
54Mbps Cardbus PC Card



(E5826) **\$429**

Routers

NETGEAR have a comprehensive range of Cable/DSL routers. All products offer standard shared internet access with NAT Firewall security and easy installation via web based configuration and DHCP. The products are plug and play and ideal for connection to either Cable/DSL or satellite broadband services. www.netgear.com.au offers specific installation information on both Telstra and Optus services.

RP114
Cable/DSL router
with integrated 4
port 10/100Mbps
switch and ability
to control web
content



(C5592) **\$259**

FR114W
Cable/DSL
ProSafe Wireless
ready Firewall
Router with
integrated 4 port 10/
100 switch



(F0913) **\$295**

FVS318 Cable/DSL
ProSafe VPN Firewall
with
8-port 10/100Mbps
switch



(F0242) **\$475**

DG814
DG814 DSL modem
router with integrated
4 port 10/100 switch



(F5181) **\$405**

FM114P
Cable/DSL ProSafe
802.11b wireless
Firewall Router,
integrated 4 port 10/100
switch and print server.



(F0904) **\$499**

FR114P
Cable/DSL ProSafe
Firewall Router, integrated
4 port 10/100 switch and
print server.



(F0902) **\$295**

Printer Servers

The
NETGEAR
print servers
enable you to
connect
your printers
to a network
for sharing
amongst
multiple PC's.



PS 101
1 port Mini
Print Server
(E5832) **\$179**



PS 110
10/100Mbps
Print Server, 2
parallel ports
(67226)

\$259



PS 111W
Wireless
Ready Print
Server
(E5833)

\$205

PS 113
10/100Mbps
Print Server,
3 parallel
ports (A3287)

\$345

Check out www.netgear.com.au for SPECIAL NETGEAR offer on Telstra BigPond™ Cable

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SEP
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Networking Solutions

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Collect Fly Buys points on your computer hardware & software when you purchase from **HARRIS TECHNOLOGY™**.

For all your small to medium business and home network needs please call for more information and pricing. We have an extensive range of fantastic D-Link products on our database.

ADSL Modem/Router *speak with the experts*

DSL-200 USB ADSL Modem. Plug and Play USB interface with the host PC through a USB port.

(B7197) **\$229**

DSL-300 Ethernet ADSL Modem Connect single PC on an Ethernet LAN to an ADSL.

(B7198) **\$339**

ADSL Inline Filter DSL-10MF - Indoor Low Pass Filter required for Telephones & Faxes when running ADSL service.

(E6973) **\$19**

DSL-10CF -Indoor Splitter allowing connection of ADSL Modem & Telephone.

(E6971) **\$36**

DSL-504

ADSL Router with 4 port 10/100Mbps Switch Connect single or multiple PC's on an Ethernet LAN to an ADSL.

(C7593) **\$425**

Best Selling



DSL-500 ADSL Router. Connect single or multiple PC's on an Ethernet LAN to an ADSL

(D0801) **\$373**

IP Router for ADSL/Cable Modem

DI-704P

IP Router for DSL/Cable Modems with 4-Port Switch & Single Port Print Server.

Built-in Bigpond Cable Login

(E5861) **\$229**

SPECIAL PRICING



DI-713P 11Mbps Wireless IP Router has 10Mbps WAN Port for DSL / Cable Modem with 3-Port 10/100Mbps Switch & Single Parallel Port Print Server.

Rent* \$6.49/wk (C7596) **\$579**

DI-707P IP Router for DSL/Cable Modems with 7-Port Switch & Single Port Print Server.

SPECIAL PRICING (E7329) **\$295**

DI-804 IP Router for DSL and Cable Modems with 4-port 10/100Mbps switch.

(C2361) **\$279**

D-Link Firewall/VPN Router

DI-804V

VPN Router for Cable / DSL. 8 VPN tunnels, DMZ, SPI, VPN Protocol PPTP & L2TP and IPSec Security.

NEW



(F4303) **\$439**

DFL-500

Secure Firewall & VPN - 30 VPN Tunnels - DMZ, SPI, - IPSec Security DES & 3 DES, Content Filtering & Virus Scanning, - VPN Protocol, - PPTP & L2TP.

NEW



Rent* \$11.93/wk (F0900) **\$1,065**

Gigabit Solution **SPECIAL PRICING**

DGS-1008T

8-Port Copper Gigabit Ethernet Switch. Unmanaged Copper Gigabit Ethernet Switch 8 x 10/ 100/ 1000Mbps Auto-Negotiating Ports.

Copper Gigabit

Rent* \$21.01/wk (D9338)

\$1,875 SPECIAL PRICING



New Product

DGE-500T 32-Bit PCI Bus Copper (RJ45) Gigabit Ethernet adapter.

SPECIAL PRICING

(E2058) **\$99**

DES-1226R 24-Port 10/100Mbps Fast Ethernet Unmanaged Switch with Option Slot or 2-Port Gigabit Module.

SPECIAL PRICING

Rent* \$11.19/wk (E7388) **\$999**

DES-1009G Gigabit ethernet Switch 8 Port 10/100Mbps Unmanaged Switch with 1 Port 1000Base T Gigabit (Copper).

SPECIAL PRICING

(D1196) **\$459**

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Networking Solutions

AirPlus 22Mbps - Industry's First 22Mbps Wireless LAN

DWL-900AP+

AirPlus 22Mbps Wireless LAN Access Point, Auto IP Address Assignment (Built-in DHCP server), - Fully 802.11b Compatible, + Up to 22Mbps with AirPlus Products.

SPECIAL PRICING

(F5423) **\$345**



**New
22Mbps
Wireless**

DWL-650+

AirPlus 22Mbps Wireless LAN PCMCIA Card.

(F5422) **\$164**



SPECIAL PRICING

DWL-520+

AirPlus 22Mbps Wireless LAN PCI Adapter.

(F5421) **\$195**



SPECIAL PRICING

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products
and
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info!

Indoor/Outdoor Wireless Bridge/Antennas

DWL-1800B

11Mbps Wireless Outdoor Bridge Base Unit.

Rent* \$37.44/wk (F7810) **\$3,958**



DWL-1800R

11Mbps Wireless Outdoor Bridge Remote Unit.

Rent* \$33.04/wk (F7812) **\$3,329**

DWL-1500

11Mbps Wireless Indoor Bridge.

Rent* \$7.38/wk

(D9147)

\$659



ANT24-0500

Indoor/Outdoor 5dBi Omni Directional Antenna.

(F4216) **\$183**

ANT24-0800

Outdoor 8dBi Omni-Directional Antenna.

(F4219) **\$245**

ANT24-1400

Outdoor 14dBi Directional Antenna.

(F5426) **\$437**

ANT24-1801

Outdoor 18dBi Directional Yagi Antenna.

(F0067) **\$485**



ANT24-0801

Indoor/Outdoor 8.5dBi Antenna.

(F4220) **\$259**



Air Pro, 54Mbps Wireless LAN

DWL-A520

54Mbps Wireless PCI Adaptor.

(F4222) **\$495**



DWL-A650

54Mbps Wireless PCMCIA Card.

(F4224) **\$455**



DWL-5000AP

54Mbps Wireless Access Point.

Rent* \$11.53/wk (F4225)

\$1,029



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Networking & Communications Converged

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NETCOMM FAST ETHERNET ADAPTORS

NEW

NP1100-4
High performance 32-bit 10/100 PCI LAN Card (E7333)
\$19



NP1300 -
CompactFlash 10Base-T LAN Adaptor (D4201)
\$135



NP1010
USB LAN Key 10/100 Fast Ethernet Adaptor (C7651)
\$79



NP1200
10/100 Fast Ethernet 32-bit PCCard with TruConnect technology (D1166)
\$99

SEP

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NETCOMM 802.11b WIRELESS NETWORKING

The fastest and easiest way to enable network connectivity wherever you need it. The NetComm wireless family allows networks to be as mobile as the people who use them. Fast and compatible with existing Ethernet technology, Wireless LANs extend the reach and the usefulness of your wired network resources. NetComm 802.11b Wireless LAN solutions means you are free to work, teach or study wherever you're most productive. There's no easier way to provide reliable, real-time LAN access away from the desk.

- Wireless LAN Access Point

NP7000 (D4196) **\$529**



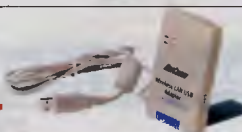
- Wireless LAN PCMCIA

NP7030 (D4198) **\$195**



- Wireless LAN USB Adaptor

NP7040 (D4199) **\$194**



- Compact Flash Wireless LAN Adaptor

NP7050 (D4200) **\$259**



NETCOMM ROUTERS

The NetComm range of Cable/DSL Routers are the perfect plug and play option to connect multiple PCs to a high-speed Broadband Internet connection or to an Ethernet backbone.

All products offer built-in NAT firewall technology, and easy installation via web based configuration and DHCP.

Not only will all of your PCs now be able to enjoy your lightning-fast Broadband Internet connection, they will also be able to share internal network data via the built-in 10/100 switch. Your NetComm broadband network will now take off at speeds faster than you ever imagined possible.

NEW

Cable/ADSL Wireless Security Router

with integrated 4-port 10/100 switch and wireless access point.

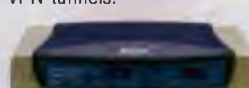
NB3000 (F3588) **\$575**



Cable/ADSL Advanced Firewall Router

with integrated 4-port 10/100 switch. Supports DOS and URL filtering, VPN, IPSec and PPTP pass through. Supports up to two simultaneous VPN tunnels.

NB3100 (F3589) **\$384**



Cable/ADSL VPN Router

with integrated 4-port 10/100 switch. Provides full IPSec VPN tunnelling and firewall protection. True end-point-to-end-point IPSec VPN solution. Supports up to 70 simultaneous VPN tunnels.

NB3200 (F3586) **\$476**



ADSL Modem + Router

- ADSL Ethernet modem and router in one with integrated 4-port 10/100 switch. Supports PPPoA, PPPoE, PPTP and Bridged protocols. NAT, IP port filtering, IPSec passthrough, remote access, DMZ hosting, DHCP.

NB3300 (F3590) **\$465**



NETCOMM FAST ETHERNET SWITCHES

NetComm switches deliver high performance 10/100 and Gigabit technology to both large and small networks in a compact affordable package.

16-port 10/100 auto-sensing professional switch (incl. 19-inch rack-mount kit)

NP2160 (E7322) **\$579**



24-port 10/100 auto-sensing professional switch (incl. 19-inch rack-mount kit)

NP2240 (E7323) **\$745**



NP2005 5-port 10/100 auto-sensing switch (D0966) **\$135**

NP2008 8-port 10/100 auto-sensing switch (D0967) **\$199**

NP2080 8-port 10/100 auto-sensing switch with internal PSU (D0968) **\$229**

Networking & Communications Converged

NETCOMM PRINT SERVERS

NetComm print servers enable you to connect your printers to a network for sharing amongst multiple PCs.

NetComm 1-Port Mini Print Server

NP3620



(92351)

\$199

3-Port 10/100Mbps Fast Print Server

NP5300



(92346)

\$398

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

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NETCOMM COMPACT FLASH PRODUCTS



CM5700 -
CompactFlash
56K FaxModem

(C5469)

\$279



NP1300 -
CompactFlash
10Base-T
LAN Adaptor

(D4201)

\$135



NP7050 -
11Mbps Type1
CompactFlash
Card

(D4200)

\$259

RENTSMART

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NETCOMM NETWORK ATTACHED STORAGE

Easily add gigabytes of storage to your network. As the amount of information generated by a business increases, so does the need to store the information in a cost-effective, easily accessible and reliable system. NetComm has now made adding gigabytes of file storage to your network as simple as connecting an Ethernet cable from your hub or switch, attaching the power cord and running through the quick start configuration wizard.

- Cross-platform network file sharing
- Enhance productivity
- Zero down-time storage expandability
- Perfect for SMB, SOHO and design
- Easy to install and manage
- Network printer sharing
- Administration options
- Compact and cost-effective
- Web based management workgroup

NAS-1000 Disk Server Series -



NAS-1080

(D0851)

Rent* \$24.01/wk

\$1,979

NETCOMM SERIAL DATA/FAX/VOICE DESKTOP MODEMS NEW V.92 STANDARD

NetComm's latest Wave & Roadster V.92 modems -

feature the latest chip technology to deliver the fastest download speeds, quickest connection, blistering uploads and the easiest way of accessing the Internet with a dial-up connection. New V.92 features also enhanced fax features & Internet call-waiting. **For information on V.92 visit www.netcomm.com.au**

Wave V.92

Rip through the net @ maximum speed with NetComm's Wave V.92. The ultimate Internet / Data / Voice & Fax Modem.

NEW



AM4066 (F3510)

\$199^{RRP}

Roadster V.92

Fast, Professional Internet connection. Now with V.92- the fastest, most reliable connections!

NEW



AM5695 (F3513)

\$199^{RRP}

InModem 56 V.92

Plug & Play Data/Fax/Voice Internal 56K V.92 Modem.

NEW



IN5699_4 (F4357)

\$49

Mega i-Modem

Offers 56K V.90 speed and efficiency, backed by the quality of the NetComm name. The Mega i-Modem is an entry level communications device, allowing you to browse the web and keep in touch via e-mail with speed and reliability.



CD2003 (E9968)

\$112



Strapped for a notebook bag - let Targus State your Case.

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*Delivery charges extra.

TARGUS
Essential Accessories for Mobile Computing

NEW
Camera Cases

DADM15



(F7091) **\$15**

DADS15



(F7101) **\$13**

DCRCO1



(F7120) **\$12**

DCUCO1



(F7130) **\$16**

DCRVO1



(F7131) **\$22**

RAKGear Slam Silver



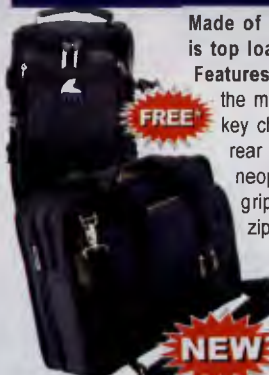
(F3511)

\$84

The latest backpack from Targus includes:

A padded notebook compartment that fits 15" screens, 2 side accessory pockets, nylon webbing zipper pulls, internal cushioned mobile phone pocket, oversized file compartment and slip pocket, accessory webbing loops on shoulder straps, contoured shoulder straps with 3-D air mesh, inner-pocket organisers and flat compartments, double-buckle wrap design for attaching extra gear, cushioned pocket for CD player with headphone port, key clip. Other colours available.

Corporate Traveller with Slip Case



(F3951)

\$106

Made of durable nylon, the Corporate Traveller is top loading for easy access to your notebook.

Features: 3 front zippered accessory compartments the main one contains a business card holder, key chain, pen holders and 4 further pockets; a rear expanding file and padded CD pockets; a neoprene padded shoulder strap; non-slip hand grips; nickel fittings and stylish chrome & black zipper pulls. Unique features of this case are: the external mobile phone pocket for easy access; an extension zip that adds a full 4cm width to the case when un-zipped and a FREE Slip Case that houses a 15" screen notebook which can be used separately or carried within.

*FREE Glacier Gear Golf Bag Cooler comes bundled with every purchase of The Corporate Traveller available: 20th July until 31 September 2002 or While Stocks last.

Sportline Standard Backpack



Platinum/Black

(F0752)

\$94

Blue/Black

(D6300)

\$94

The Sportline Backpack appeals to today's mobile professionals with an active lifestyle. Constructed of heavy-duty fabrics with nylon webbing reinforcement this backpack contains a padded computer compartment to protect your notebook, multiple compartments for your files and accessories and padded shoulder straps for superior comfort. Other features include a mobile phone pouch, moulded carrying handle and a cushioned mesh back.

Sportline Deluxe Backpack



TSB315

(F0754)

\$119

The TSB315 is constructed of heavy-duty fabrics with nylon webbing reinforcement, a padded computer compartment to protect your notebook, multiple compartments for your files and accessories, and padded shoulder straps for superior comfort. Slightly larger than the Standard Sportline Backpack, this pack features a weather-proof flap and more pockets, as well as a mobile phone pouch & CD or MP3 player pockets. Available in cool blue/black colour scheme.

BlackTop Range

A funky NEW blue/black range designed with edgy, urban sophistication and featuring the signature rubber Compu-Tread™ for design and shock absorption.



BlackTop Messenger Case

(E3509)

\$67

BlackTop Standard Notebook

(E6996)

\$83

BlackTop Deluxe Notebook

(E7009)

\$89

The Standard & the Deluxe Notebooks include an adjustable padded notebook section, a rear pocket for files or magazines and a front file section with pockets for CDs, pens, a mobile phone, PDA and more! Both cases feature heavy-duty steel fittings, self correcting nylon zippers, moulded carrying handles & detachable padded shoulder straps. The Deluxe Notebook has an extra expanding file section. Messenger case with zip down work station, also available.

Trademark Range

The Targus Trademark Line represents the most affordable full-featured notebook cases available today.

- Constructed of stylish koskin & durable nylon.
- Multiple pockets for improved organisation.
- Reinforced heavy-duty steel fittings.
- Lockable ergonomic zipper pulls.
- New lightweight design.



A. Trademark Messenger (C9570) **\$57**

B. Trademark Notepac (C9571) **\$67**

C. Trademark Notepac Plus (C9572) **\$87**

D. Trademark Universal (C9573) **\$109**

SEP

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Hot New Accessories from Targus

Wireless Optical Mini Mouse

Smaller and lighter than most mice, the Wireless Optical Mini Mouse provides you with wireless navigation up to one metre from a notebook or desktop computer. Featuring instant plug & play, 27MHz operating frequency, a small USB receiver key and an optical sensor, the mouse can be used on virtually any surface. Also featured is an LED on the scroller wheel which lights when the batteries are low. Windows 98, Me, 2000 and XP compatible. Exterior dimensions: 9.8 x 5.9 x 3.8cm.

NEW

(F3343) **\$95**

Ultra Mini 4-Port USB Hub

This ultra light-weight, compact 4 port USB hub is suitable for PC notebooks or USB-enabled desktop computers.

Over current protection on each port prevents power shutdown of the hub. Supports both full-speed and low-speed transfer rates and has a 1m cable.



NEW

PA055U

(F0749) **\$42**

PDA Combo Kits

Kit includes, case, removable swivel belt clip, pack of 4 PVC screen protectors & a spare stylus.

The case can be worn on your belt or slipped into your pocket, has a concealed pocket for your spare stylus, is snug fitting with a slim appearance & made from light weight Neoprene.

- CHKIT1 - iPAQ (F0735) **\$27**
- CHKIT2 - Jornada/Tosh (F0736) **\$27**
- CHKIT3 - Palm M500/505. (F0737) **\$27**



PDA In - Vehicle Charger

PDA In-Vehicle Chargers Charge your PDA while on the road. Ideal for the mobile user, this charger plugs into your cigarette lighter to keep you fully powered.



- CHCV01 - iPAQ 38xx (F0738) **\$19**
- CHCV03 - Palm (F0739) **\$19**
- CHCV02 - Jornada (F0743) **\$19**
- CHCV04 - iPAQ 36xx/Tosh e570.(F0745) **\$19**

Keypad with integrated calculator

Keypad with integrated calculator.

The Targus Mobile Mini Keypad is a 17 key numeric pad with 12 additional calculator function keys. Lightweight and compact, it is fully compatible with Windows 98, 2000, Me, XP and greater. Neatly stores a 91cm USB cable.



PAUK001 V.3 (F2985) **\$99**

Universal Auto/Air Adapter

A dual purpose power source, the new-look, ultra-slim Universal Auto/Air allows you to plug virtually any notebook into airline seats with Empower™ capability and works in vehicles with standard cigarette lighters. Power or re-charge your notebook on the road or in the air.



- PA360U - most IBM, Toshiba & Compaq notebooks (F0747) **\$216**
- PA380U - most Dell, HP, Sony, Fujitsu & Panasonic notebooks. (F0748) **\$216**

USB Legacy Range **NEW**

PA088U USB to Serial Adaptor

As notebook computers grow smaller and smaller, and more and more devices move over to Firewire and USB, there is not as much demand for "Legacy" ports to be fitted to computers. Unfortunately, many people still have high quality devices that must connect through either a serial or parallel port which may be missing from their new laptop. The Targus USB to Serial port adaptor cable allows the use of legacy serial devices through your computer's standard USB port. The Targus USB Legacy Range offers simple, tidy, connectivity solutions.

(F5641) **\$55**

PA084U USB to Ethernet Adaptor

The Targus USB to Ethernet adaptor is the easiest way to connect to a network, or get on the internet by connecting it to your cable modem or DSL modem. The Targus USB to Ethernet adaptor is compatible with USB 1.1 specifications and meets all IEEE Ethernet standards.

(F5642) **\$89**

PA096U USB to Parallel Adaptor

The Targus USB to Parallel adaptor is the easiest way to connect a USB port or an Inkjet, Laser or Dot Matrix printer that require a "Parallel" port. The Targus USB Legacy Range offers simple, tidy, connectivity solutions.

(F5643) **\$49**

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*Delivery charges extra

Security Products

Defcon™ PC Card Authenticator

PC Card Form Factor with a retractable fingerprint reader



(F3551)

\$413

Defcon™ Authenticator /USB Hub.

Fingerprint Biometric Authentication with integrated two port USB hub.



(E5313)

\$259

Defcon™ 3

Remote security system with 94 decibel alarm.



(C3814)

\$99

Defcon™ 1

Anti-theft system that guards your notebook with motion detection

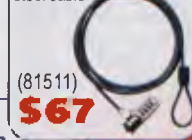


(66929)

\$89

Defcon™ CL

Cable Lock with cut-resistant, galvanised steel cable



(81511)

\$67

For more information or corporate solution enquiries, call 1300 13 9999 email info@ht.com.au





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COMMITMENT TO QUALITY

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Intelligent KVM and USB Products

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SEP
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ServerLink LCD KVM Switches

With a 15" TFT LCD screen, keyboard, touchpad and integrated KVM switch housed in an industry standard 19" 1U-height rack drawer, these LCD KVM switches save you up to 1/3 of valuable rack cabinet space.

NEW



Integrated KVM Switch

LKS-101	1U Console Drawer 15" TFT LCD, KB & mouse	Rent*\$40.34/wk (F7677)	\$4,264
LKS-801	8 port 1 User KVM - LCD, KB & mouse in 1U drawer	Rent*\$45.84/wk (E7463)	\$4,845
LKS-802	8 port 2 User KVM - LCD, KB & mouse in 1U drawer	Rent*\$46.50/wk (F7678)	\$5,039
LKS-1602	16 port 2 User KVM - LCD, KB & mouse in 2U drawer	Rent*\$52.49/wk (F7679)	\$5,688

ServerLink SOHO KVM Switches



INCLUDES ALL CABLES!

SL-251-P	2 port ServerLink inc. 2 x 2m PS2/VGA cables (E3692)	\$199
SL-451-P	4 port ServerLink inc. 4 x 2m PS2/VGA cables (E3694)	\$299

Serverlink Infinity KVM Switches

on-screen-display



SL-221	2 port ServerLink KVM for PS2 (B3047)	\$269
SL-421	4 port ServerLink KVM for PS2 (A9890)	\$349
SL-821	8 port ServerLink KVM for PS2	Rent* \$10.97/wk (97888) \$979
SL-1621	16 port ServerLink KVM for PS2	Rent* \$17.92/wk (97890) \$1,599



Comsol USB Storage Drives

PC Compatible, compact and light-weight, driverless under Microsoft Windows ME, 2000 and XP.

UT-0032	32MB USB Pocket Flash Drive (F7691)	\$109
UT-0064	64MB USB Pocket Flash Drive (F7692)	\$144
UT-0128	128MB USB Pocket Flash Drive (F7693)	\$235
UT-0256	256MB USB Pocket Flash Drive (F7694)	\$499



NEW

Comsol USB Infrared Adapter

This adapter is for enabling IrDA wireless data communication through a standard USB port. Ideal for wireless data transfer between desktop PC and notebook, PDA or mobile phone.



UIR-100	USB to IrDA wireless adapter (D8944)	\$129
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Comsol USB to Serial Converter

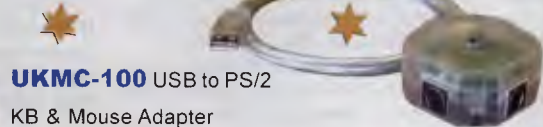
This USB to 9 pin RS232 serial converter allows you to connect serial devices to a USB port on a computer. It supports serial devices such as modems, cellular phones, digital cameras & PDAs.

UMC-100	USB to 9 Pin RS232 Serial Converter (80782)	\$69
----------------	---	-------------



Comsol USB to PS/2 KB & Mouse

The UKMC-100 allows you to plug a standard PS/2 keyboard and standard PS/2 mouse into a single USB port on a computer.



UKMC-100	USB to PS/2 KB & Mouse Adapter (B0557)	\$69
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PRICING AND SPECIFICATIONS MAY CHANGE. PLEASE REFER TO PAGE 2 FOR DETAILS.



CD and DVD Media: Storage for Life

DataLifePlus CD-R - 40x



NEW
super
AZO

80 Min.
700MB 1x - 40x
10 Pack

(F1265) **\$13**

DataLifePlus CD-R - 24x



super
AZO

80 Min.
700MB
1x - 24x
10 Pack

(D4114) **\$12**

80 Min.
1x - 24x Singles

(D5933) **\$2**

Not all items are
in stock at all
stores but can be
ordered for Pick-
up or Delivery.
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TECHNOLOGY.

*Delivery charges extra.

Verbatim DVD Media

DVD-R



4.7GB DVD-R for General
Data - Singles

(C8840) **\$12**

Printable surface
discs also available

DVD-RW



4.7GB DVD-RW
(version 1.1) - Singles

(C8841) **\$15**

DVD+R



4.7GB DVD+R - Singles

(E7340) **\$12**

DVD+RW



4.7GB DVD+RW - Singles

(D9166) **\$15**

DataLifePlus CD-R Audio



metal
AZO

80 Min.
10 Pack
(C7889) **\$18**

80 Min.
Singles

(D0011) **\$2**

Pocket Colours 8cm CD-R



Mini CD's that fit in your pocket!

Store up to 3
hours of
MP3's or up
to 185MB of
pictures, files

21Min, 185MB
1x -16x 5 Pack
(D9192) **\$8**

or any data you like. Compatible
with any standard tray based CD
player or burner.

21Min, 185MB
1x-16x 10 Pack

(C9459) **\$15**

Printable CD-R Media



In Spindles of 50
Inkjet Printable
80 Min. 24x

(E4363) **\$49**

Silver Thermal Printable
80 Min. 16x

(D0562) **\$49**

See page 35 for CD Printers.

DataLifePlus Colours CD-R



super
AZO

80 Min. 700MB 1x - 24x
coloured CD-R's
in a 25 Pack

(B1355) **\$29**

80 Min. 700MB 1x - 24x
coloured CD-R's
in a 10 Pack

(D9227) **\$13**

DataLife CD-R

- Third generation Phthalocyanine Recording Dye Technology.
- Scratch Resistant Surface.



NEW

80 Min. DataLife SlimCase
24x 10 Pack

(F1266) **\$13**

80 Min. DataLife Spindle
16x 25 Pack

(C7093) **\$24**

DataLifePlus CD-RW

700MB CD Rewritable
2x - 4x 5 Pack Colours

(D9230) **\$9**

650MB 2x - 4x
Singles

(77492) **\$2**

650MB 4x -10x Singles

(B2658) **\$2**

650MB 4x -12x Singles

(F3941) **\$2**

Verbatim DataLifePlus CD's represent the latest in technology. Featuring a proprietary blue Super-Azo dye which has the best resistance to sunlight, silver reflective layer for optimum read and write performance and multispeed recording.

Did you
know...



Peripherals and Accessories

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.

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*Delivery charges extra.



Pocket PC Accessories

CompactFlash Modem



(83607) **\$259**

CompactFlash LAN Card



(F0767) **\$239**

CompactFlash GPS Card



Rent* \$6.71/wk
(E5015) **\$599**

Compact Camera



NEW

(F0865)

\$249

Compact Bluetooth



NEW

(F0866)

\$259

Digital Memory Readers



CompactFlash

(F0861) **\$38**

MemoryStick

(F0864) **\$38**

Secure Digital/MultiMedia

Card (F0863) **\$38**

SmartMedia

(F0862) **\$38**

USB Connectivity, Portable Compact Design, Hot swappable.

6-in-1 USB Reader

(F5533) **\$94**



Digital Memory Cards

CompactFlash

32MB CompactFlash (B2921) **\$59**
64MB CompactFlash (B2922) **\$89**
128MB CompactFlash (B2923) **\$155**
256MB CompactFlash (C0777) **\$309**
512MB CompactFlash (E1225) **\$699**

SecureDigital Cards

16MB SecureDigital (D4115) **\$65**
32MB SecureDigital (D4116) **\$108**
64MB SecureDigital (D4117) **\$175**
128MB SecureDigital (D5918) **\$289**

SmartMedia

16MB SmartMedia (B2915) **\$29**
32MB SmartMedia (B2916) **\$48**
64MB SmartMedia (B2917) **\$93**
128MB SmartMedia (C3680) **\$187**

MultiMedia Cards

32MB MultiMediaCard (B9873) **\$59**
64MB MultiMediaCard (B9878) **\$134**
128MB MultiMediaCard (F7833) **\$285**

Expansion Cards

FIREWIRE AND USB For Laptops



Cardbus FireWire Card

(B9849) **\$105**



USB 2.0 Cardbus Card

(E6328) **\$99**

For Desktops



PCI FireWire Card (90689)

\$65



PCI FireWire USB 2.0 Combo Card (E5013)

\$153



PCI USB 2.0 Card (F2992)

\$75

I/O CARDS

IDE Ultra DMA 133 Raid Card

(E7377) **\$85**



Ultra-SCSI Card

(90681) **\$69**



Serial Cards, Parallel Cards, USB Hubs and FireWire Hubs also available.

Verbatim

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Prices are subject to change. Check here for latest prices & products!!

Web Direct
www.ht.com.au/cat/verbatim

CD/DVD Duplicators and Publishers

Verbatim CopySmart CD and DVD Copiers

No PC required
Single Button Copy
All drives burn simultaneously

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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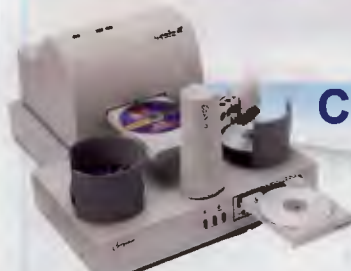
*Delivery charges extra.



Drives	40x CD-R	Drives	2x DVD-R
1	Rent* \$13.77/wk (F3430) \$1,229	3	Rent* \$41.63/wk (F7628) \$4,400
3	Rent* \$21.74/wk (F1867) \$1,940	5	Rent* \$58.74/wk (F7629) \$6,600
7	Rent* \$36.66/wk (F1349) \$3,875	7	Rent* \$73.79/wk (F7630) \$8,800

PRIMERA TECHNOLOGY, INC.

Composer Duplicators



- Choose 1, 2 or 4 32x CD-R or 2x/8x DVD-R drives
- 50 to 400 Disc Capacity
- Fully automated disc production
- Comes with software, firewire card and cables
- Optional inkjet and thermal printers

Composer CD-R 32x, 50 disc Rent* \$46.57/wk (F7830)

from \$5,047

Desktop Publishers

R I M A G E™

Choose 1, 2 or 4 40x CD-R or 2x/8x DVD-R drives

- Network burning software included with unlimited user site license
- Integrated inkjet printer
- 50 – 110 disc capacity
- Fully automated disc production
- Comes with software, firewire card and cables

Desktop 800 CD-R 40x, 60 Disc

Rent* \$79.43/wk (F7882)

from \$9,473


PRIMERA TECHNOLOGY, INC.

Signature IV CD Printer



- 1200x1200dpi res
- Fast: 27 seconds per disc.

Rent* \$29.72/wk (B9917)

\$2,995

Signature Pro CD Printer



- 2400dpi
- Superfast
- Dual Ink cartridges

Rent* \$37.60/wk (C3681)

\$3,789

Inscripta Printer

Special Price



- 610 x 305dpi thermal
- Durable finish

Rent* \$46.25/wk (B2932)

\$4,889

See page 33 for Printable Discs for these printers

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Sales: 1300 13 9999
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SEP
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Multimedia: DVD & Blank Media

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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*Delivery charges extra.

MEDIA* DVD-R



DVS-R47A

- 4.7GB in jewel case
- for video or data
- suitable for 2X recording

(E3852) **\$13**

DVS-RP470SDF

- white inkjet printable in jewel case

(C2322) **\$15**

DVD-R



DVS-R47AS5

- 4.7GB 5 pack in slim jewel cases
- for video or data
- suitable for 2X recording

(E7289) **\$49**

DVD-RW



DVS-RW47B

- rewritable 4.7GB in jewel case
- for video or data

(D9300) **\$15**

*Not for use with Pioneer DVR-S201 authoring drive.

Pioneer



DVR-A04 DVD-R/RW Writer

Rent* \$10.07/wk (E3676)

\$899RRP

FEATURES:

- Writes: DVD-R (2x)
- DVD-RW (1x)
- CD-R (8x)
- CD-RW (4x)

INCLUDES:

- Veritas RecordNow & DLA for data
- ArcSoft ShowBiz for video editing including MPEG2 encoding function
- PowerDVD XP 4.0 for DVD movie playback
- Sonic MyDVD for authoring
- 1 x DVD-R media
- 1 x DVD-RW media
- Permanent pen
- 5 x Blockbuster DVD movie rental vouchers

Collect 1,000 Bonus Fly Buys points when you purchase E3676 between 20/08/02 - 30/09/02

FLY BUYS
1,000
BONUS POINTS

DVR-104EXT

NEW

Rent* \$13.43/wk (F7699)

\$1,199RRP

DVD-R/RW/CD-R/RW drive in firewire (IEEE1394)/ USB 2.0 external case.

SOFTWARE INCLUDED: MEDIA INCLUDED:

- RecordNow/DLA
- ArcSoft ShowBiz,
- DVDIt! PE, (value \$1,699RRP)
- PowerDVD XP
- 1 x DVD-R
- 1 x DVD-RW

DVD-A06SZ 16x

SLOT LOADING DVD-ROM DRIVE RETAIL KIT



(E5965)

\$169

FEATURES:

- 16X slot loading DVD-ROM drive (40X for CD)
- Ultra DMA66
- Vertical or horizontal mounting
- 2 year warranty

SOFTWARE INCLUDED:

- PowerDVD XP

BONUS:

- 5 x DVD movie rental vouchers



DCR-111KIT

NEW

COMBO DRIVE RETAIL KIT Records to CD-R/ RW & plays DVD



(F7700) **\$299RRP**

FEATURES:

- Records at 12X for CD-R
- Records at 10X for CD-RW
- Plays at 12X for DVD-ROM
- 40X for CD-ROM
- 2MB buffer

SOFTWARE INCLUDED:

- RecordNow/DLA,
- PowerDVD XP

MEDIA INCLUDED:

- 1 x CD-R

BONUS:

- 5 x DVD movie rental vouchers

SEP

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FINANCE METHODS
ARE SUBJECT TO
APPROVAL

Smart Storage Solutions

Zip 100 USB Powered

An affordable total storage solution as easy to use, but far superior to, the floppy drive. Iomega's Zip® 100MB USB-Powered drive is affordable, reliable, easy to use and has a sleek, durable design powered through the USB cable for complete plug-and-play compatibility.



(D0587) **\$165**

Portable Hard Disk Drive

Iomega portable HDD drive is a complete solution that makes security, recovery and data storage easy. QuikSync™ automatic back-up and disaster recovery software protects your files. Built in a durable, slim design that's easy to take with you. Available in 20GB capacity.



USB2 Card sold separately

(E7321) **\$436**

all items are stock at all es but can be erred for Pick-or Delivery, **ARRIS** CHNOLOGY. *livery charges extra.

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NAS Servers

Choose Iomega for easy-to-install and manage network storage solutions that allow multi-platform file sharing and data consolidation. Hot-swappable drives and RAID 5 data protection, Iomega NAS servers deliver enterprise class data access and reliability for small business budgets. Plus, you choose the capacity, OS, level of performance and data reliability – so you get the optimum data storage and backup solution.



160GB Rent* \$58.91/wk (C5567)

\$6,619

320GB Rent* \$78.28/wk (C5568)

\$8,795

Predator

Iomega Predator 24x10x40 CD-RW drive

The all new and exciting Iomega CDRW drive. An external 24x10x40 CDRW with USB 2.0 capability offers you blazing speed performance in terms of write speeds including a BURNPROOF feature to eliminate wasted CDs. The drive has one of the most unique designs with its sleek, slim and stylish architecture. Now included, the Iomega Hotburn Software for effortless 2 step CD creation.



(F7799) **\$454**

Host Powered 250 USB

NEW – Host-powered Zip® 250MB USB drive. Now it's even easier to take your information with you.

The Zip® 250 USB drive is now available with a USB cable that provides both data and power, so you don't need any external power source. Its easy to connect (just plug it in) and easy to launch (no rebooting)! This new drive is compatible with most major operating systems and all Zip® 100MB and 250MB Zip® disks.



(B6404) **\$319**

Zip 100MB disk

(23772)

\$20

10-pack:

(21889)

\$189

Zip drive carry case

(31823)

\$49

Zip disk 250MB

(74454)

\$29

Zip disk 250MB 10 Pack

(74452)

\$249

Jaz 1 GB disk

3 Pack

(32844)

\$569

Jaz 2 GB disk

3 Pack

(57271)

\$615

Nikon COOLPIX

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Direct

www.ht.com.au/cat/nikon

Extraordinary Digital

Not all items are in stock at all stores but can be ordered for Pick-up or Delivery.
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*Delivery charges extra.

Coolpix Cameras

Coolpix 885

A highly featured 3-megapixel digital still camera. Features include superior image ease-of-use and new Small Picture function for easy emails. •From beginners to advanced amateurs •Lens equivalent to 38-114mm in 35mm format •12 Scene Modes and quick review •One button easy transfer.



Rechargeable Li-ion Battery.

Rent* \$12.19/wk (E2196) **\$1,088**

Coolpix 775

A friendly and uncomplicated camera, turning moments into memories. Transfer button automatically copies pictures from the camera to the computer, ready for saving. •Medium resolution 2-megapixel CCD •Lens equivalent to 38-115mm in 35mm camera format •7 Scene Modes and quick review.



Rechargeable Li-ion Battery.

BONUS
Lexar 32MB Card
32 MB Card Available:
1-30 September 2002

Rent* \$8.84/wk (E2195) **\$789**

Coolpix 4500

•High Resolution 4-megapixel CCD •4x optical zoom with digital zoom up to 4x •2cm close up macro •16 Scene Modes •Voice memo function •5-Area Multi-Autofocus •Panorama Assist feature helps stitching panoramas •Small Picture feature for emails •Perspective Control helps to 'straighten' converging lines •One button transfer of images.



Rent* \$17.36/wk (F4003) **\$1,549**

Coolpix 2000

•Medium resolution 2-megapixel CCD •3 x optical zoom with digital zoom up to 2.5x •5 Scene Modes with easy mode dial •Movie Mode •Easy upload transfer button •Small Pic feature for email •AA Batteries.



Rent* \$6.55/wk (F4002) **\$585**

Coolpix 2500

•Pocket Sized •Style with a twist •2-megapixels •3x optical zoom and up to 4x digital zoom •12 Scene Modes •Small Picture mode for easy emails •One button transfer •Quick review function.



Rent* \$8.95/wk (E5781) **\$799**

BONUS
Lexar 32MB Card
32 MB Card Available:
1-30 September 2002

Swann
COMMUNICATIONS

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Swann. More than modems!

SWANN
USB
MULTI-HUB

USB 4-Port hub



(75882) **\$55**

SWANN
VERSACAM
MINI

USB webcam



(E7234) **\$68**

SWANN FIREWIRE® PRO DV KIT

Everything you need for easy, fun digital video editing

- Captures full screen video from your camera to your computer's hard drive with transfer speeds of up to 400Mbps
- Complete with Ulead 5 VideoStudio DVD Special Edition, SuperGoo, PhotoSoap and VideoWorks software CDs
- 1 year warranty

(A1794) **\$179**

NOW WITH
ULEAD 5 DVD
EDITION



SWANN FIREWIRE® STARTER KIT

- Captures full screen video from your camera to your computer's hard drive with transfer speeds of up to 400Mbps
- Bundled with Ulead® 5 VideoStudio™ DVD Special Edition
- 1 year warranty

(75886) **\$115**

NOW WITH
ULEAD 5 DVD
EDITION



SWANNFIRE CARDBUS

FireWire PCMCIA Card

- Firewire solutions for laptop users
- Data transfer speeds of up to 400Mbps
- For laptop users and travellers
- Allows "hot swapping"
- 1 year warranty

(C2307) **\$129**



SWANN SPEED DEMON

56K V.90 External Voice/Fax/Data Modem

- Cool graphite colour
- Great value for money
- Drivers and application CD included
- Bonus Telstra 100 hours Internet Access CD
- 1 year "Hassle Free" warranty

(87970) **\$95**



SWANNSMART II USB 56K V.90 EXTERNAL MODEM

- Connect to the Internet with speed and reliability
- Bus Powered so there's no need for extra power supply cables
- Bonus Telstra 100 hours Internet Access CD & Swann's user-friendly NetTools CD
- Smooth and Sleek styling
- 5 year "Hassle Free" warranty

(B3311) **\$159**



SWANNSMART II INTERNAL MODEM

Full Featured Voice, Fax Data Modem

- Connect to the Internet with ease and speed
- Quality performance and reliability
- Easy installation & use
- Bonus Telstra 100 hours Internet Access CD & Swann's user-friendly NetTools CD
- 3 year "Hassle Free" warranty

(F7685) **\$45**



Swann's NEW VIDEO EDITING collection will be available SOON! Please visit the website below for further information

Website: www.swann.com.au Tech Support: 1300 13 8324 (outside Melbourne Metro): (03) 9421 3273 (Melbourne Metro) or tech@swann.com.au

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NEW

Bluetooth

Cordless controller for presentations. Emphasise your key points with the built-in laser pointer. Move a switch and your presenter becomes a cordless optical mouse. Incorporates Bluetooth technology for exceptional reliability. 5-year warranty.



USB Mini Receiver

(E4364) **\$379**

Pocket Digital™

NEW



Pocket Digital is a credit card sized camera that lets you take pictures wherever you are. It comes in a sleek aluminium design that fits into your pocket. Capture up to 52 high resolution pictures at 1.3 megapixels, then download them to your PC with a single click. USB connection. 2 year warranty

(F0257) **\$245**

QuickCam® for Notebooks

NEW

Compact USB camera designed specifically for notebooks. The USB connection allows for easy setup and the included software make the camera easy to use while away from home. Its integrated mount fits all notebooks and folds up for easy storage and lens protection when not in use. It provides high quality colour video input for instant messaging and video conferencing applications.



(F3093) **\$129**

Logitech® Z340

The Logitech Z340 produces clear highs and distortion-free lows through a revolutionary 3-piece system design, delivering twice the bass energy of similar systems. The satellites provide a convenient headphone jack and volume control. An internal power supply eliminates bulky wall adaptors. 2-year warranty.



(E1070) **\$105**

Elite™ Keyboard

NEW

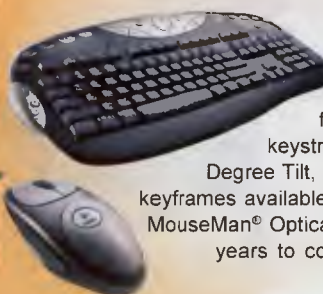
Provides expert controls that simplify everything you do. The ultra-flat design brings maximum efficiency with one-touch controls, enhanced commands and smart navigation. 5-year warranty.



(F4395) **\$88**

Cordless Freedom™ Optical

The ultimate cordless keyboard and optical mouse. Seamlessly access and navigate the Internet at the touch of a button or the scroll of the iNav wheel.



Intuitive multimedia controls are at your fingertips and allow you to control MP3s, DVDs and CDs from your keyboard. Every keystroke is made easy with Zero Degree Tilt, offering one of the slimmest keyframes available. The included Cordless MouseMan® Optical will perform perfectly for years to come. 5-year warranty.

optical

(C6106) **\$215**

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*Delivery charges extra.

QuickCam Express

(D5894)

\$99



Cordless MouseMan Optical

(C1186)

\$129



MouseMan Traveller

(D4014)

\$109



MouseMan Dual Optical

(D4013)

\$79



Optical Mouse

(B9948)

\$45



Internet Navigator

(D0560)

\$63



Kodak

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Web Direct

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Share Moments. Share Life™

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HARRIS TECHNOLOGY.
*Delivery charges extra.



Kodak LS420

Simple. Little. Fun.

Introducing a nifty little camera that fits anywhere, goes anyplace, and does just about anything.

- 2.1MP for beautiful prints.
- Kodak colour science technology.
- Introduces new night shot flash mode.
- On-camera print button, Video with audio capabilities.
- Part of the EasyShare System.
- Movie mode, audio recording during capture.

Rent* \$7.56/wk (E7255)

\$675

Kodak



PICTURE CARDS

32MB Picture Card

(62677) **\$57**

64MB Picture Card

(82249) **\$89**

128MB Picture Card (A5253)

\$165

Kodak DX4900

The first print-optimized Camera.

•4.0MP point & shoot digital camera designed to be one touch simple •New 3x Advanced Digital Zoom •3 Sharpness models (sharp, standard, soft) •High Speed Sequence shooting up to 3FPS (Burst) •Flash modes, auto, fill, red-eye, off •ISO settings auto 100 - 400 or selectable 100, 200, 400 •White Balance modes Auto, Daylight, Tungsten, Fluorescent •Shutter Speed Controls Auto 1/2000 sec to 16 seconds.



Rent* \$11.04/wk (E3471)

\$985

Kodak DX3215

Making digital easy— one picture at a time.

Great pictures made easy! Want to get into digital with ease? You've found your camera. •This camera gets you started with 1.3MP resolution for great prints up to 5" x 7" •A 4x zoom (2x optical and 2x digital) lets you get closer to the fun •It's the perfect camera to get you into digital picture-taking •One touch picture transfer •8MB internal memory.



(C9539) **\$389**

Kodak DX3900

The high-performance camera.

•Set your own colour mode, ISO and lighting exposure settings to get your perfect picture. •Thanks to 3.1MP resolution, you'll get excellent picture quality on prints up to 11" x 14" •The DX3900 comes with 6x zoom (2x optical and 3x digital) and a COMPACTFLASH Card to keep you shooting longer •CCD Image resolution 2160 x 1440 pixels •Burst maximum 8 pictures at 0.8MP resolution •Lens 35mm - 70mm, (35mm equiv.) •Auto focus.



Rent* \$8.79/wk (E7368)

\$785

Kodak CX4230

NEW

Easy share Zoom digital camera.

- 2.0MP for prints up to 20cm x 25cm (8in. x 10in.)
- Kodak Retinar, aspheric, all-glass lens with autofocus
- 6X zoom (3X optical, 2X digital)
- New Share button on camera • Kodak colour science inside •16MB internal memory and MMC/SD card expansion
- Compatible with optional Kodak EasyShare camera dock



Rent* \$6.60/wk (F7947)

\$589

Kodak DX3500

Simple-to-use.

•Get crisp, vibrant prints thanks to its 2.2MP resolution and 3x digital zoom •The DX3500 comes equipped with a COMPACTFLASH Card expansion slot so you can boost its memory capacity •KODAK Picture Software lets you instantly view, edit, e-mail, and print your pictures.



(C9587)

\$469

Kodak DX3700

Great pictures made easy.

EasyShare DX3700 Digital Camera. It has 3.1MP resolution for excellent picture quality up to 11" x 14". Getting closer to the fun is easy with the 3x digital zoom. •8MB internal memory •Compatible with the Kodak EasyShareCamera Dock.



Rent* \$6.71/wk (D0792)

\$599

Kodak



QUALITY PAPERS

Ultra Glossy 15 sheets (B1656)

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Satin 15 sheets (D3251)

\$14

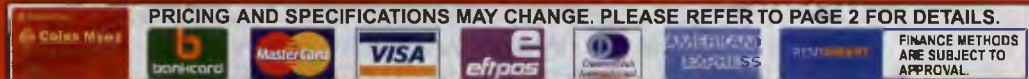
Satin 75 sheets (D3258)

\$35

40

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Nothing Else Compares

NEC MultiSync LCD1550VM

15" LCD Multimedia Monitor

- 1024 x 768
- Built in Speakers



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*Delivery charges extra.

Rent* \$11.19/wk (F1868) **\$999**

High Performance

NATURAL FLAT CRT MONITOR RANGE

NEC Uses Aperture Grille Technology for a Totally Flat Screen



FE700+

17" CRT Monitor
1280 x 1024 @ 66Hz
Flat Aperture Grille

(D1191)

\$429



FE750+

17" CRT Monitor
1600 x 1224 @ 74Hz
Flat Aperture Grille

(D1192)

\$549



FE950+

19" CRT Monitor
1792 x 1344 @ 68Hz
Flat Aperture Grille

Rent* \$10.74/wk (D1193)

\$959



FP1355

22" CRT Monitor
2048 x 1536 @ 75Hz
Flat Aperture Grille

Rent* \$19.60/wk (D1194)

\$1,749

NEC

V530

15" CRT Monitor
1280 x 1024
(B9125)

\$255

V730

17" CRT Monitor
1280 x 1024
(B7522)

\$329

V930

19" CRT Monitor
1600 x 1200

(C9739)

\$549

NEC HAS A WIDE RANGE OF LCD & CRT MONITORS, DATA PROJECTORS AND PLASMA DISPLAYS



VT45

SVGA; 800 x 600
1000 ANSI Lumens
Horizontal & Vertical Lens Shift
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Rent* \$37.11/wk (D1195)

\$3,739

LCD1700V



17" LCD Monitor

1280 x 1024
SUPER SLIM
BEZEL!

Rent* \$19.60/wk (E7297)

\$1,749



42MP3 PlasmaSync*

42" Plasma Multimedia Display
16:9 Aspect Ratio
160 Degree Viewing Angle

HDTV COMPATIBLE

Stand is not included

Rent* \$88.03/wk (D9354)

\$10,499



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SyncMaster 753DFX 17" CRT Monitor

SOHO Series Features:

- 16" Viewable Screen
- 0.20mm dot pitch (Horizontal)
- 1280 x 1024 max resolution @ 66Hz
- DynaFlat - Infinitely Flat Tube
- Smart III Surface Treatment (Anti-Static & Anti-Glare)
- On Screen Digital Display
- Plug & Play Compatibility
- MPR-II/NUTEK certified

(C1283) **\$345**

SyncMaster 955df 19" CRT Monitor

Graphix Pro Series Features:

- 18" Viewable Screen
- 0.20mm dot pitch (Horizontal)
- 1600 x 1200 max resolution @ 68Hz
- DynaFlat - Infinitely Flat Tube
- Onscreen Digital Display
- Smart III Surface Treatment (Anti-Static & Anti Glare)
- MPR-II/NUTEK Certified
- Plug & Play Capability

Rent* \$6.37/wk (C3975) **\$569**



SyncMaster 151s 15" LCD Monitor

Portrait or Landscape:

- *Optional Pivot to Portrait- head of monitor can be turned.*
- 15" Viewable Screen
- 1024 x 768 max resolution @ 76Hz
- Colours 16.2M
- H.Frequency 30 ~ 61 kHz
- V.Frequency 50 ~ 75 Hz
- Contrast 330:1
- Luminance 250cd/m2
- Viewing Angle 140°/120°
- Input connectors 15pin D-Sub
- Sync Type Composite H/V, SOG
- Power 30W (Max.)

Black Rent* \$9.51/wk (D4036) **\$849**

SyncMaster 171S 17" LCD Monitor

Portrait or Landscape:

- *Optional Pivot to Portrait- head of monitor can be turned.*
- 17" TFT Computer Monitor
- 1280 x 1024 @ 75Hz
- 16.7 Million Colours
- 160 degree viewing
- non multi-media.

Silver Rent* \$18.69/wk (D9313) **\$1,668**

Black Rent* \$18.69/wk (E4308) **\$1,668**

Ivory Rent* \$18.69/wk (E9969) **\$1,668**



SyncMaster 181T 18" LCD Monitor

The SyncMaster 181T is the ideal display for all business and professional applications. Its new slim design refined with Samsung's digital technology allows the product to fit all working environments. The SyncMaster 181T is power efficient as well. It consumes less than 1 Watt of power in power off mode, and its built-in power adaptor frees you from a dangling power brick, leaving your desk clean and simple. DVI-D/Analogue and DVI-D cable is included in box, brightness 500:1.

- Medically Certified • Ultra slim bezel.

Rent* \$24.36/wk (E7318) **\$2,455**

SyncMaster 191T 19" LCD Monitor

Brightness 500:1. No other monitor in it's class! The SyncMaster 191T is the ideal display for all business and professional applications. Its new slim design refined with Samsung's digital technology allows the product to fit all working environments. The SyncMaster 191T is power efficient as well. It consumes less than 1 Watt of power in power off mode, and its built-in power adaptor frees you from a dangling power brick, leaving your desk clean and simple. DVI-D/Analogue and DVI-D cable is included in box. • Medically Certified • Ultra slim bezel.

Rent* \$25.68/wk (E7319) **\$2,588**



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- Extend to a total of 5 Years Return to Base
- Upgrade Return to Base of Warranty Extension to On-Site

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Canon Super Value Pack

Scanner + Printer + USB Cable + Software

Canon

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D646U



S200SP



The Canon Value Pack is the ideal answer when you need printing and scanning at an affordable price!

Contains:

- Canon S200SP Bubble Jet Printer - printing at up to 2880dpi, ideal for printing everything from homework to photographs easily and quickly.
- CanoScan D646U Scanner, with all the performance you need to scan photos, artwork, text documents and more with high-quality results.
- All the Cables you need to connect to your computer.
- Bonus Software CD containing Greenstreet Publisher V3, NetAccelerator V3 and Floor Plan 3D Design Suite.

(F7664)

\$299RRP

S100SP Bubble Jet Printer

- High speed printing, up to 5 ppm black text and up to 2 ppm colour.
- USB interface for Windows
- Dual ink drop sizes for fine printing
- 720 x 360dpi

(E4209) **\$115**

S300 Bubble Jet Printer

- Up to 11 black and white and 7.5 Colour pages per minute
- Up to 2400 x 1200dpi print resolution
- Separate black and tri-colour ink tanks
- USB Interface for Windows
- Compact footprint - ideal for the home office
- Colour lasts up to 25 years using Canon's Photo Paper Pro

(D4023) **\$218**

S520 Bubble Jet Printer

- Prints up to 14 B/W and 9 colour ppm
- Up to 2400 x 1200 print resolution
- Colour lasts up to 25 years using Canon's Photo Paper Pro
- Connect to USB or Parallel
- Creates prints without borders up to A4 size
- Replace all four ink tanks individually

(E1136) **\$359**

S750 Bubble Jet Printer

- First Bubble Jet With 20ppm
- 2400 x 1200dpi
- Print full bleed A4 photos
- Four Individual Ink Tanks

(E1134) **\$449RRP**

N670U Flatbed Scanner

- One touch scan controls
- USB Interface
- 600 x 1200 dpi
- Scan, click and burn photos onto CD's.
- Advanced Z-Lid cover simplifies scanning of bulky items, books and magazines

(1005) **\$175**

N1240U Flatbed Scanner

- Amazing 1200 x 2400dpi optical with selectable resolution up to 9600dpi.
- Stylish charcoal and aluminium finish.
- New Z-lid for scanning thick books etc.
- Software includes OmniPage and PhotoShop Elements

(C7589) **\$Call**

D1250U2 /D1250U2F Flatbed Scanner

- High Speed At the Right Price
- 1200 x 2400 DPI Optical Resolution
- USB 2.0 For Faster Scanning
- Easy One Touch Control
- Photo Studio 2000 Omnipage Pro 9.5 OCR Software

(E1246) **\$218**

• with 35mm Film Scanning (E1230) **\$299**

D2400UF Flatbed Scanner

- Film and Slide Capable Scanner
- 2400 x 4800 dpi resolution
- 48-bit colour
- Built-in film scanner for 35mm, 120 format and 4 x 5" format
- Wide aperture lens
- USB Interface

Rent* \$7.61/wk
(B9840) **\$679**

S900/S9000



•S900

Rent* \$8.23/wk
(E1135)

\$735

•Prints A4

Photo's in approx 1min

•2400 x 1200 Optical dpi •Six Individual Photo Ink Tanks

•A3+ Printing on S9000 Rent*

\$12.65/wk (E1248) **\$1,129**

MPC 400

NEW

- 2400 x 1200dpi • All colour functions: Copier, Printer, Scanner • Fast printing (up to 17ppm black, 12ppm colour) • Cost-effective Bubble Jet printing and copying, with separate ink tanks • Flatbed scanning
- High-speed copying (17cpm black, 10cpm colour).

Rent* \$10.07/wk (F4134) **\$899RRP**

MPC 600F

NEW

- All colour functions: Copier, Printer, Scanner, Fax with Auto Document Feeder • Super G3 (33.6 Kbps) - 3 secs per page fax transmission • Fast printing (up to 17ppm black, 12ppm colour) • High print resolution (up to 2400 x 1200 dpi) • Cost-effective Bubble Jet printing, copying and faxing, with separate ink tanks • Flatbed scanning with Auto Document Feeder • High-speed copying (17cpm black, 10cpm colour).

Rent* \$12.31/wk (F4136) **\$1,099RRP**

CAMERAS...

PSA100



(E5357)

\$369

PSA200



(F4062)

\$469

PSA30



1.2 MEGA PIXEL
(E3967)

\$595

PSA40



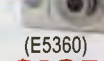
2.0 MEGA PIXEL

(E3969)

\$765

PowerShot
DIGITAL
IXUS V2

NEW



(E5360)

\$935

PowerShot
DIGITAL
IXUS 330

NEW



(E5361)

\$1,045

S30



3.2 MEGA PIXEL
(D5915)

\$1,277

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Web Direct

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PRINTER



EPSON STYLUS C41UX

•Up to 12ppm black text printing (at economy mode) •Up to 1440dpi photo quality printing resolution •USB-enabled and complete with cable •Intelligent Ink System •Fast, easy set-up and operation •Includes USB cable in the box!

(F0853) **\$119**

PRINTER



EPSON STYLUS C70

•A4 printing •16ppm black text (economy) •3.5ppm text & photo (normal) •2880dpi for best resolution •Monitoring of ink consumption with the Intelligent ink system •Pigment inks for prints that are fade, water and smudge resistant •USB and Parallel port interface, •MicroPiezo Print Head 3pl in colour and 6pl in black.

(D3070) **\$419**

PRINTER



EPSON STYLUS PHOTO2100

•Up to 2880 x 1440 dpi •7 colour individual ink system with a new light black and either photo or matte black •A3+ •Epson Intelligent ink system •True BorderFree printing •Roll paper printer and auto cutter •75yrs lightfastness •Up to 1.3mm thick media support.

Rent* \$20.66/wk (F2969) **\$1,844**

COLOUR LASER PRINTER



EPSON ALC1000

High quality, affordable A4 colour laser printer. Ideal for small business or home office environments. Up to 20ppm mono, 5ppm in full colour, EPSON 2400 RIT, 80MB memory, low running costs and easy to maintain. Proprietary EPSON imaging technologies ensure superior output with clear, sharp text and high-contrast, colour-accurate images.

Rent* \$27.48/wk (E3772) **\$2,769**

MONO LASER PRINTER



EPSON EPL-5900

•12ppm •True 1200dpi Resolution •200MHz RISC Processor •USB & IEEE1284 Parallel Interface •8MB Memory – Expandable up to 136MB •Standard 250 Sheet Multi Purpose Tray & Optional 500-Sheet Lower Paper Cassette Unit

Rent* \$7.49/wk (E5160) **\$669**

MONO LASER PRINTER



EPSON EPL-5900L

The class leading desktop laser printer. Fast durable and high quality for the value conscious home and small office •Superior print quality •Fast 12ppm •1200dpi class resolution.

Rent* \$6.54/wk (E5318) **\$584**

SCANNER

EPSON EXPRESSION 1640XL

The Expression 1640XL A3+ scanner features EPSON's most advanced scanning technologies providing high speed, maximum detail and superior sharpness and clarity.

Rent* \$49.82/wk (B1330) **\$5,399**

TECHNICAL LASER PRINTER



EPSON ALC4000

•Up to 16ppm in full-colour! •Less than 30 seconds warm up time •True 1200dpi, with AcuLaser 2400dpi Class RIT •192MB, expandable to 1,024MB •Networking and Duplexing Standard •Large paper capacity with versatile paper handling •Advanced Job Management including Confidential Job printing (requires optional hard drive).

Rent* \$49.36/wk (F3409) **\$5,349**

PRINTER



EPSON STYLUS C80

•Up to 20ppm for black text (at economy mode) •Constant monitoring of ink consumption with the Intelligent ink system in each of the four ink cartridges •Pigment inks for prints that are fade, water and smudge-resistant •Super fine printing with up to 2880dpi.

(D1665) **\$529**

PRINTER



EPSON STYLUS PHOTO1290

•A3+ •6 colour photo printing •Border-free edge to edge printing •Max res 2880 x 720dpi with variable sized droplet technology •Over 20 years lightfast prints •Features print image matching technology •On demand inkjet (piezoelectric) •Black text 9.4ppm (economy) •Text & photo 3.0ppm (normal) •Full page colour 1.3ppm (normal).

Rent* \$11.18/wk (C2150) **\$998**

COLOUR LASER PRINTER



EPSON ALC2000

Workgroup colour laser printer that delivers professional quality output. Up to 20ppm mono, 5ppm in full colour, Epson 2400 RIT, 32MB memory, integrated network adapter. Proprietary Epson imaging technologies ensure superior output with clear, sharp text and high-contrast, colour-accurate images.

Rent* \$38.56/wk (A7365) **\$4,076**



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hp LaserJet & Business Inkjet Printers

hp LaserJet 3300 & 3330

full-featured multi-function printer
•Up to 14 ppm (A4 size) •compact size to save office space •The HP Ultra Precise print cartridges print more than 2,500 pages each •Optional high-capacity cartridge print up to 3,500 pages •Duty cycle of 10,000 pages-per-month •One-year warranty •Digital copying 14cpm 600 x 600dpi •Flatbed scanner scans up to 216 x 381, 600ppi colour •90MHz mm •32MB RAM.

Collect 2000 Bonus Fly Buys points when you purchase E3828 or E3864 between 20/08/02 - 30/09/02



hp LaserJet 3300mfp

digital printer-copier-scan Rent* \$12.72/wk (E3828) **\$1,135**

hp LaserJet 3330mfp

printer-fax-copier-scan Rent* \$17.31/wk (E3864) **\$1,545**

hp LaserJet 4600 Series

The HP Colour LaserJet 4600 series printers and HP smart printing supplies are a simple, reliable, and affordable way to add high-quality, high performance, and high-speed colour laser printing to your business. These powerful printers expand along with your business and can be shared over a network. Their ease of use, flexible options, and superior print quality make them the printers of choice for any office looking for an affordable solution to business colour printing needs.



hp LaserJet 4600 96MB RAM

Rent* \$43.26/wk (E7298) **\$4,573**

hp LaserJet 4600dn 96MB RAM, auto-duplexing

Rent* \$49.73/wk (E7299) **\$5,389**

hp LaserJet 4600dtn 160MB RAM, auto-duplexing, additional

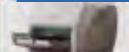
500 sheet feeder tray Rent* \$63.16/wk (E7300) **\$7,096**

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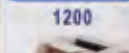
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*Delivery charges extra.

hp LaserJet 1000 USB

Rent* \$6.71/wk (C9361) **\$599**

hp LaserJet 1200 Series

Rent* \$8.79/wk (B9799) **\$785**1200 scan/copy Rent* \$10.36/wk (B9968) **\$925**1200n-16MB Rent* \$14.51/wk (B9958) **\$1,295****\$1,295****\$925****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295****\$1,295**

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inkjet cp1160 printer free**

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or dtns only **OR**

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hp LaserJet 8550 Series

Get ahead with professional in-house printing

With its advanced features and exceptional performance, your productivity will be dramatically increased. The industry standard for departmental network colour printing, this top-of-the-line printer offers a complete network printing solution that grows with your business. •Paper sizes up to A3 •60,000 page duty cycle and 24 ppm •Print on both sides of the page with the optional duplex unit (standard on 8550dn & gn).

hp LaserJet 8550 Rent* \$70.89/wk (98869) **\$7,964**hp LaserJet 8550n Rent* \$81.12/wk (98870) **\$9,675**hp LaserJet 8550dn Rent* \$99.53/wk (98871) **\$12,279**hp LaserJet 8550gn Rent* \$116.39/wk (98872) **\$14,359**

hp LaserJet 4100mfp Series

intelligent multi-function printer

•Print copy & colour scan in one machine. The multi-function printer saves costs and office space •Prints at 24ppm (A4) with first page out in less than 12 seconds •The 250MHz processor, 64MB RAM and 5.1GB hard disk enable fast processing of large files and print jobs •Scan resolution up to 600 ppi •Walk-up copying is easy and simple •HP print cartridge and software work hand-in-hand to allow users to monitor and order supplies, hence ensuring uninterrupted printing, consistent output quality and efficient workflow.



hp LaserJet 4100mfp

Rent* \$57.66/wk (E3829) **\$6,249**

hp Inkjet cp1700 Series

professional wide-format (A3+) colour printers

Designed for small businesses and design professionals. A powerful communication tool that produces professional colour business documents, collaterals, premium •Up to 16ppm black and 14.5ppm colour •16MB built-in RAM •Up to 5,000 pages per month duty cycle •Supports Windows 95, 98, Me, NT4.0, 2000 •Energy Star compliant •Off mode 6 watts •150-sheet standard input tray •Wide format printer media sizes 4 x 6" (A6) to 13 x 19" (A3+) •Straight paper path.



hp colour Inkjet cp1700

Rent* \$12.83/wk (E0150) **\$1,145**

hp colour Inkjet cp1700d

Rent* \$15.45/wk (D6139) **\$1,379**

hp 2200d (base unit)

Rent* \$17.22/wk (B9956) **\$1,537**hp 2200dn Rent* \$22.92/wk (B9957) **\$2,045**hp 2200dtn Rent* \$26.09/wk (B9958) **\$2,629****\$2,629****\$2,629****\$2,629****\$2,629****\$2,629****\$2,629****\$2,629**

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hp deskjet 3420

- HP PhotoREt 3 colour layering technology - more colour shades for incredibly realistic images •up to 2400 x 1200dpi colour printing on photo papers •print longer lasting photos with specially formulated hp fade-resistant inks and photo papers •prints up to 10ppm in black and 8ppm in colour •on-screen ink level indicator •on-screen print cancel lets you stop unwanted print jobs at a click •USB.



(F7708) **\$149**

hp deskjet 3820

- Photo-quality with HP PhotoREt 3 colour layering technology •up to 4800 optimised dpi in colour (on hp colourfast photo paper & 1200 x 1200 input dpi) and rich black text •specially formulated hp fade-resistant inks and photo papers •one-touch print cancel button •low-ink indicator light •prints up to 12ppm in black and 10ppm in colour •networkable with optional hp jetdirect wired and wireless print servers.



(F7709) **\$199**

hp deskjet 5550

- Get best photo-quality with HP PhotoREt 3 colour layering technology •up to 4800 optimised dpi in colour (on hp colourfast photo paper & 1200 x 1200 input dpi) and rich black text •optional 6-ink colour printing with HP PhotoREt 4 colour layering technology •prints up to 17ppm in black and 12ppm in colour •networkable with optional hp jetdirect wired and wireless print servers •borderless 4" x 6" photo printing on hp colourfast photo paper •ink backup printing mode •automatic paper- type sensor.



(F7710) **\$299**

hp officejet V40

All In One Scanner/ Printer/ Fax/ Copier

- 8ppm •600dpi black text •Up to 7ppm and 2400dpi color printing on premium photo papers •36bit color scanning with 600 x 1200 •600 x 1200dpi enhanced scan resolution •Plain paper black and color fax with 14.4k modem •60 speed dials for fast transmission •20 page automatic document feeder •Colour fax and copy at a touch of the button - without being connected to a PC •Included OCR software keeps you from having to retype hardcopy text documents.



(D7688) **\$499**

hp PSC 950

Printer/ Scanner/ Copier/ Fax

- Up to 12ppm black and 10ppm colour printing •600 x 600dpi resolution •Preview and print photos from a digital camera memory card without PC intervention •Creative copying features include instant poster, automatic fit-to-page function •Flatbed design •Scan directly into your e-mail •Flatbed fax - great for sending short faxes (1-3 pages) by manually feeding each page •Receive faxes; 14.4Kbps fax modem with OCR software •100-sheet input paper tray, 20-sheet 4 x 6 inch photo paper tray •Optional networking.



Rent* \$7.16/wk (E7288) **\$639**

hp D145

Colour all-in-one with high-speed printing/ copying

- Print up to 2400 x 1200dpi on HP Premium Photo Papers •Print photos directly from your digital camera's memory card (CompactFlash, SmartMedia, Sony Memory Stick) with HP's Photo Proof Sheet Technology - with or without a PC •Get fast printing at up to 19ppm in black, up to 16.8ppm in colour •Copies up to 18 sheets per minute in black, and up to 16 in colour •Fast colour faxing with a 33.6Kbps modem, one-touch key pads, speed dials and other fax functions.



Rent* \$14.33/wk (E7707) **\$1,279**

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ink cartridges



- No 29 Black Inkjet Cartridge**
(21919) **\$69**
- No 45 Black Inkjet Cartridge**
(22643) **\$69**
- No 78 Tri Colour Inkjet Cartridge**
Large (97335) **\$139**

toner



- hp c4092a** LaserJet print
Cartridge for HP LaserJet 1100, 3200,
2500 page toner (70459) **\$129**
- hp 92298a** LaserJet Black Print
Cartridge for LJ 4/M, 4+/M+, 5/N/M
6800 page Toner (07995) **\$195**
- hp 92298x** LaserJet Black Print
Cartridge for LJ 4/M+/M+/5/5M/5N
8800 Page Toner (42504) **\$209**

paper



- hp c7006a** hp photo quality, semi-
gloss, A4, 25 sheets
(C6840) **\$13**
- hp q1936a** hp premium inkjet
paper, A4, 200 sheets
(D9329) **\$37**
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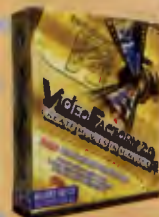
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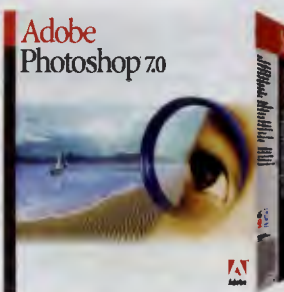
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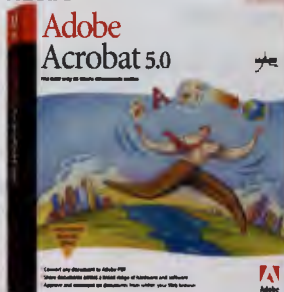
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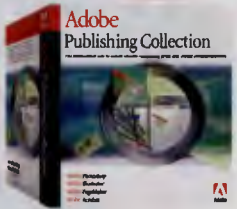


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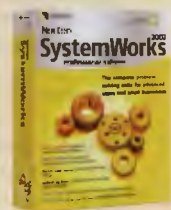
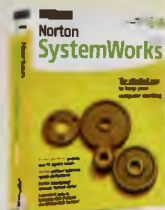


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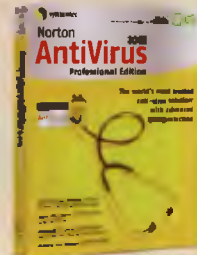
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Norton Internet Security 2002 Pro

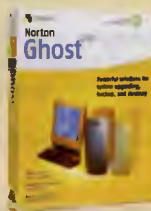
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Norton pcAnywhere V10.5 / 5 User

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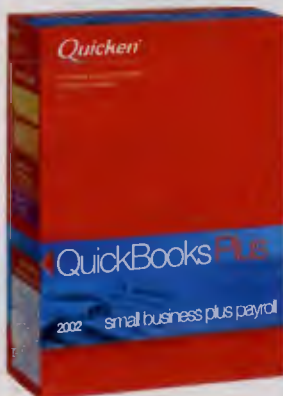


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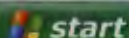


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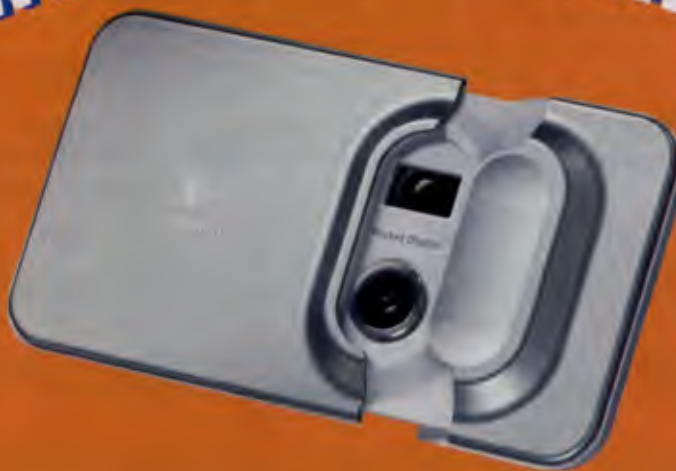
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